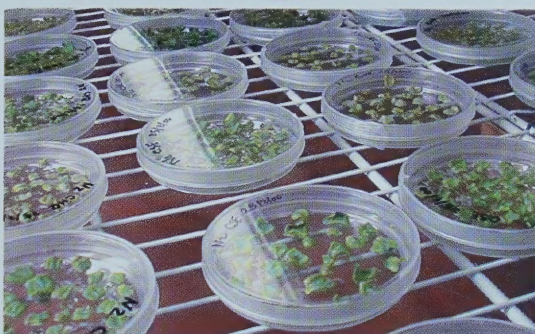


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Michigan State University

Michigan Agricultural Experiment Station

ANNUAL REPORT

1999

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# Michigan Agricultural Experiment Station ANNUAL REPORT



109 Agriculture Hall  
Michigan State University  
East Lansing, MI 48824-1039  
517-355-0123  
[maesdir@msu.edu](mailto:maesdir@msu.edu)  
<http://www.maes.msu.edu>

Report prepared under the direction of J. Ian Gray, director of the Michigan Agricultural Experiment Station, and  
Debbie McCaffrey, administrative assistant.

Design by Christine Altese; editing and production by Jamie DePolo, MAES information officer, ANR Communications.

All illustrative photos by Kurt Stepnitz, MSU photographer, except as noted.

All chairperson photos by Harley Seeley, MSU photographer.



# 1999

## *A year of challenge, opportunity and change*

In 1999, the Michigan Agricultural Experiment Station at Michigan State University continued its commitment to agricultural and natural resources research to meet the needs of the people of Michigan.

✦ Budget issues are always challenging, but the MAES's reliance on strategic planning allowed for a productive year.

✦ To complete its administrative team, the MAES hired Janet Bokemeier, a noted rural sociologist, and Gary Lemme, a nationally recognized agronomist, as associate directors.

A sociology researcher at MSU since 1991, Bokemeier had been serving as half-time assistant director with special responsibility for the behavioral sciences since 1996. She is considered among the top rural sociologists in the nation in the study of the intersection of gender, work and family in rural America.

Lemme had been professor and head of the West Central Research and Outreach Center at the University of Minnesota since 1992. During that time he also coordinated the Minnesota Fusarium Head Blight Initiative, a cooperative initiative with the state's wheat and barley growers to develop research and outreach to address this disease.

The MAES now has the strength and diversity of interests to address the broad mission of the MAES. The MAES research agenda has expanded greatly in the past few years; the MAES is extremely fortunate to have a multidisciplinary team that can act quickly and decisively on a wide range of research issues.

✦ Project GREEN (Generating Research and Extension to meet Economic and Environmental Needs), a cooperative effort by plant-based commodities and businesses and MSU to address long-term research and extension needs in the Michigan plant industries, funded a number of projects in 1999, including education and research on pesticide/integrated pest management (IPM), disease control, marketing and economics of fruit and vegetables, field crops, Christmas trees, value-added products and ornamental plants and flowers. There was a good balance of research and outreach projects, and the MAES thanks the chairpersons, faculty members and industry representatives who served as project reviewers for their time and constructive reviews.

Plant agriculture and processing industries asked MSU for rapid, integrated work that developed and implemented improved management programs to increase profitability while reducing undesirable environmental impacts and improving food safety. To meet this request, Project GREEN funded the restructuring of several entities on campus in 1999. The Pesticide Research Center became the Center for Integrated Plant Systems (CIPS). Its mission is to develop, evaluate, integrate and extend knowledge about ecologically based integrated crop management (ICM) policies, strategies, tactics and tools. MSU Diagnostic Services was created from three

agricultural diagnostic services — the Plant and Pest Diagnostic Clinic, the Arthropod Diagnostic Clinic and the Nematode Diagnostic Services Laboratory. The range of services has been expanded and Diagnostic Services lab space has been renovated. The MSU Agricultural Weather Office (MSUAWO) now is jointly sponsored by the MAES, MSU Extension, the MSU



Dr. J. Ian Gray

Department of Geography and the Michigan Department of Agriculture Climatology Division. Selections on its Web site <<http://www.agweather.geo.msu.edu>> are provided by MSUAWO and the National Weather Service. Access to National Weather Service data and products is made possible through an agreement with UNIDATA/University Corporation for Atmospheric Research in Boulder, Colo.

Project GREEN has a Web site that provides the latest information on projects and services. The address is <<http://www.green.msu.edu>>.

✦ Tuberculosis in Michigan's deer and cattle populations became a source of great concern in 1999. MSU is working with state partners — including the Department of Natural Resources, the Department of Agriculture and the Department of Community Health — to establish research and educational programs to help address the issues surrounding this problem.

✦ The Families and Communities Together (FACT) Coalition was created when the Coalition for Children, Youth and Families and Communities (CYFC) was restructured and refocused. FACT is a multidisciplinary coalition of MAES researchers, MSU faculty members, MSU Extension staff members from on campus and around the state, and professionals from community organizations such as government agencies and foundations. It is funded by the MAES, MSU Extension and the Office of the Provost. The purpose of the FACT Coalition is to facilitate research and outreach efforts that meet the needs of Michigan families, foster innovative collaboration between MSU and communities, and support and develop the capacity of communities to serve their citizens.

✦ The Upper Peninsula Experiment Station, in Chatham, celebrated its 100th anniversary Aug. 6–7, 1999, with special field days on current crop and animal production and open houses at the station. The station was created in 1899 with a donation of 160 acres from the Lake Superior and Ishpeming Railroad and a \$5,000 grant from the Michigan Legislature. Today, the station's focus is forages and alternative crops. The dairy and beef herds are used to evaluate various forages or forage systems for those that are best suited to the Upper Peninsula.



✧ In college and departmental personnel matters in 1999, J. Ian Gray, associate vice provost and director of the MAES, was named interim vice provost. He took over the vice provost duties of Fred Poston, who left the office of vice provost and dean of the College of Agriculture and Natural Resources after being named interim vice president for finance and operations and treasurer. (Poston was subsequently appointed to this position permanently.) William Taylor, chairperson of the Department of Fisheries and Wildlife, was named acting dean of the College of Agriculture and Natural Resources. Tom Coon, MAES fisheries and wildlife researcher, was named acting chairperson of the Department of Fisheries and Wildlife.

Kenneth Corey, dean of the College of Social Science, was named senior research adviser to the vice president for research and graduate studies, as well as a professor in the Department of Geography. Philip R. Smith, associate dean of the College of Social Science, was named acting dean.

C. Gerald Haarer, director of the Land Management Office (LMO) for 20 years, retired. Chuck Reid, associate director of the LMO, was named acting director. The MAES will miss Jerry's commonsense approach to management and is delighted that Chuck is the acting director.

The Department of Agriculture and Natural Resources Education and Communication Systems (ANRECS) was formed from the merger of three units: the Department of Agricultural and Extension Education, Outreach Communications and ANR Computer Services. Kirk Heinze, acting chairperson of the Department of Agriculture and Extension Education, was named acting chairperson of ANRECS. The department is searching for a permanent chairperson.

Gus de Zoeten, chairperson of the Department of Botany and Plant Pathology, stepped down from that position. Ray Hammerschmidt, MAES scientist, was named acting chairperson.

Boyd Ellis, chairperson of the Department of Crop and Soil Sciences, retired. Taylor Johnston was named acting chairperson.

Richard Groop was named chairperson of the Department of Geography after Rene Hinojosa stepped down. Groop remains director of the Center for Remote Sensing and Geographic Information Science.

Edward Mather was named acting director of the National Center for Food Safety and Toxicology after Robert Hollingworth stepped down to return to the faculty.

Thomas Conner was named chairperson of the Department of Sociology after Christopher Vanderpool stepped down and returned to the faculty. Vanderpool also has an appointment in the National Center for Food Safety and Toxicology.

The Department of Pathology was restructured and all MAES faculty members now have appointments in the

Department of Veterinary Pathology. Willie Reed is the interim chairperson of the department.

Larry Olson, who was facilitator of the Plant Coalition, returned to the faculty of the Department of Entomology and is on special assignment as Cooperative State Research, Education and Extension Service interim national program leader for pesticide applicator training in Washington, D.C.

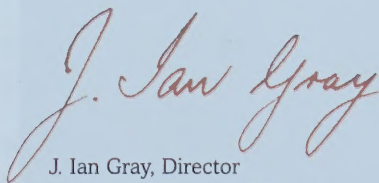
The MAES thanks all department chairpersons and unit heads for their commitment and dedication to the MAES mission.

✧ The Cooperative State Research, Education and Extension Service (CSREES) completed its review of the MSU departments of Food Science and Human Nutrition, Animal Science and Botany and Plant Pathology in late 1998. All reviews were satisfactory. The Department of Crop and Soil Sciences will be reviewed in 2000. The reviews are important as we prepare departments to meet the challenges of the next decade. They also are used for faculty position planning.

✧ The MAES continues to enjoy a productive and strong working relationship with many commodity and processor groups and government agencies. In 1999, the MAES was pleased to help sponsor the first nursery and landscape field day at the Horticulture Teaching and Research Center on campus. The success of MAES programs is based on the closeness of these relationships.

✧ A two-day grant-writing workshop sponsored by the MAES and the Office of the Vice President for Research and Graduate Studies and coordinated by Frank D'Itri, MAES researcher, attracted more than 60 participants, even though the initial plan was to limit attendance to 50. The authors of the four best draft proposals each received \$2,000 grants.

✧ The new millennium will offer new opportunities and challenges for the citizens of Michigan. By gathering input from our stakeholders, the MAES will be poised to assist the state in meeting these agricultural, natural resources, and social and behavioral science needs in 2000 and beyond.



J. Ian Gray, Director  
Michigan Agricultural Experiment Station



# Michigan Agricultural Experiment Station

As of 10-1-99

**J. Ian Gray**, Interim Vice Provost and Director

**Janet L. Bokemeier**, Associate Director

**Gary D. Lemme**, Associate Director

**Doreen K. Woodward**, Assistant Director

**Debbie McCaffrey**, Administrative Assistant

**Linda Haubert**, Support Staff

**Martha Lovejoy**, Support Staff

**Nan Judy**, Support Staff

**Isidra Pérez**, Support Staff



Photo by Bruce Fox



## MAES Affiliated Deans

As of 10-1-99

**William W. Taylor**, Acting Dean

College of Agriculture and Natural Resources

**Julia R. Miller**, Dean

College of Human Ecology

**George E. Leroi**, Dean

College of Natural Science

**Philip R. Smith**, Acting Dean

College of Social Science

**Lonnie J. King**, Dean

College of Veterinary Medicine



# MAES Unit Administrators

*(Units receiving base funding)*

As of 10-1-99

**Kirk L. Heinze**, Acting Chairperson  
ANR Education and Communication Systems

**Larry G. Hamm**, Chairperson  
Agricultural Economics

**Ajit K. Srivastava**, Chairperson  
Agricultural Engineering

**Maynard G. Hogberg**, Chairperson  
Animal Science

**William L. Smith**, Chairperson  
Biochemistry

**Raymond K. Hammerschmidt**, Acting Chairperson  
Botany and Plant Pathology

**Taylor J. Johnston**, Acting Chairperson  
Crop and Soil Sciences

**Stanley L. Flegler**, Acting Director  
Center for Electron Optics

**Edward J. Grafius**, Chairperson  
Entomology

**Marjorie J. Kostelnik**, Chairperson  
Family and Child Ecology

**Thomas G. Coon**, Acting Chairperson  
Fisheries and Wildlife

**Mark A. Uebersax**, Chairperson  
Food Science and Human Nutrition

**Daniel E. Keathley**, Chairperson  
Forestry

**Richard E. Groop**, Chairperson  
Geography

**Wayne H. Loescher**, Chairperson  
Horticulture

**Dana G. Stewart**, Chairperson  
Human Environment and Design

**Mark E. Whalon**, Acting Director  
Center for Integrated Plant Systems

**Michael J. Klug**, Director  
Kellogg Biological Station

**Charles J. Reid**, Acting Director  
Land Management

**Frederik J. Derksen**, Chairperson  
Large Animal Clinical Sciences

**Jerry B. Dodgson**, Chairperson  
Microbiology

**Edward C. Mather**, Acting Director  
National Food Safety and Toxicology Center

**Bruce R. Harte**, Director  
School of Packaging

**Joseph D. Fridgen**, Chairperson  
Park, Recreation and Tourism Resources

**William S. Spielman**, Chairperson  
Physiology

**Kenneth Keegstra**, Director  
MSU-DOE Plant Research Laboratory

**Richard E. Groop**, Director  
Center for Remote Sensing

**Cynthia C. Fridgen**, Chairperson  
Resource Development

**Thomas L. Conner**, Chairperson  
Sociology

**Willie M. Reed**, Interim Chairperson  
Veterinary Pathology

**Jon F. Bartholic**, Director  
Institute for Water Research

*Michigan Agricultural Experiment Station  
Outlying Stations —10-1-99*

MAES OUTLYING STATIONS





**1. CLARKSVILLE HORTICULTURAL EXPERIMENT STATION***Established 1974*

9302 Portland Road  
 Clarksville, MI 48815  
 Phone: 616-693-2193  
 FAX: 616-693-2317  
 Gerald Skeltis  
*Farm Manager*  
 Phil Schwallier  
*Coordinator*

**2. DUNBAR FOREST EXPERIMENT STATION***Established 1925*

12839 S. Scenic Drive  
 Rt. 1, Box 179  
 Sault Ste. Marie, MI 49783  
 Phone: 906-632-3932 or  
 906-786-1575  
 Ray Miller  
*Nonresident Forester*

**3. W. K. KELLOGG BIOLOGICAL STATION***Established 1928*

3700 E. Gull Lake Drive  
 Hickory Corners, MI 49060  
 FAX: 616-671-2351  
 Bernie Knezek 517-353-4569  
*Director, Agricultural Programs*  
 Mike Klug 616-671-2341  
*Director, Programs and Development*

**4. W. K. KELLOGG EXPERIMENTAL FOREST***Established 1932*

7060 N. 42nd Street  
 Augusta, MI 49012  
 Phone: 616-731-4597  
 FAX: 616-731-4597  
 Greg Kowalewski  
*Resident Forester*

**5. LAKE CITY EXPERIMENT STATION***Established 1928*

5401 W. Jennings Road  
 Lake City, MI 49651  
 Phone: 231-839-4608  
 FAX: 231-839-8663  
 Doug Nielsen  
*Farm Manager*

**6. MONTCALM RESEARCH FARM***Established 1966*

4747 McBrides Road  
 Lakeview, MI 48850  
 Phone: 517-365-3473  
 Richard Crawford  
*Research Technician*

**7. MUCK SOILS RESEARCH FARM***Established 1941*

Rt. 3  
 9370 E. Herbison Road  
 Laingsburg, MI 48848  
 Phone: 517-641-4062  
 Ron Gnagey  
*Farm Manager*

**8. NORTHWEST MICHIGAN HORTICULTURAL RESEARCH STATION***Established 1979*

6686 S. Center Highway  
 Traverse City, MI 49684  
 Phone: 231-946-1510  
 FAX: 231-946-1404  
 James Nugent  
*Coordinator*  
 Bill Klein  
*Farm Manager*

**9. FRED RUSS FOREST EXPERIMENT STATION***Established 1942*

20673 Marcellus Highway  
 Decatur, MI 49045  
 Phone: 616-782-5652 or  
 616-731-4597  
 Greg Kowalewski  
*Nonresident Forester*

**10. SAGINAW VALLEY BEET AND BEAN RESEARCH FARM***Established 1971*

3066 S. Thomas Road  
 Saginaw, MI 48603  
 Phone: 517-781-1160  
 FAX: 517-781-5282  
 Paul Horny  
*Farm Manager*

**11. SOUTHWEST MICHIGAN RESEARCH AND EXTENSION CENTER***Established 1987*

1791 Hillandale Road  
 Benton Harbor, MI 49022  
 Phone: 616-944-1477  
 FAX: 616-944-3106  
 James Ertman  
*Farm Manager*  
 Thomas Zabadal  
*Coordinator*

**12. TREVOR NICHOLS RESEARCH COMPLEX***Established 1967*

6237 124th Avenue  
 Fennville, MI 49408  
 Phone: 616-561-5040  
 FAX: 616-561-5314  
 Matthew Daly  
*Farm Manager*

**13. UPPER PENINSULA EXPERIMENT STATION***Established 1899*

P.O. Box 168  
 E3774 University Drive  
 Chatham, MI 49816  
 Phone: 906-439-5114  
 FAX: 906-439-5698  
 Paul Naasz  
*Operations Supervisor*

**14. UPPER PENINSULA TREE IMPROVEMENT CENTER***Established 1986*

6005 J Road  
 Escanaba, MI 49829  
 Phone: 906-786-1575  
 FAX: 906-786-9370  
 Ray Miller  
*Resident Forester*

**15. MSU MERILLAT EQUINE CENTER***Established 1997*

2828 Wolf Creek Highway  
 Adrian, MI 49221  
 Phone: 517-265-6779  
 FAX: 517-263-9294  
 Shorty Parks  
*Farm Manager*

**\* EAST LANSING FIELD RESEARCH FACILITIES***Established 1888*

109 Agriculture Hall  
 East Lansing, MI 48824-1039  
 Phone: 517-355-3272  
 FAX: 517-353-5406  
 Charles J. Reid  
*Acting Director, Land Management*



# Alphabetical List of MAES Scientists

As of 10-1-99

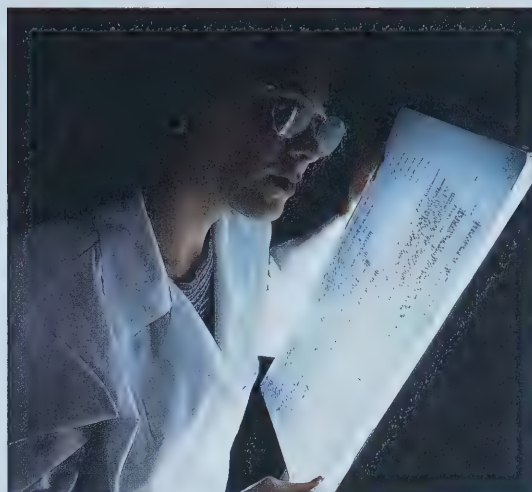
Faculty members with dual MAES appointments are listed in both of the departments in which they serve.

| NAME                               | DEPARTMENT                       |
|------------------------------------|----------------------------------|
| Adams, Gerard C.                   | Botany and Plant Pathology       |
| Allen, Michael                     | Animal Science                   |
| Allison, Richard F.                | Botany and Plant Pathology       |
| Aronoff, Marilyn                   | Sociology                        |
| Aulerich, Richard J.               | Animal Science                   |
| Ayers, George S.                   | Entomology                       |
| Bagdasarian, Michael               | Microbiology                     |
| Baird, James H.                    | Crop and Soil Sciences           |
| Baker, John C.                     | Large Animal Clinical Sciences   |
| Bakker-Arkema, Fred W.             | Agricultural Engineering         |
| Balander, Richard J.               | Animal Science                   |
| Banks, Bobby D.                    | Animal Science                   |
| Bates, Ronald O.                   | Animal Science                   |
| Batie, Sandra S. <sup>1</sup>      | Agricultural Economics           |
| Beaudry, Randolph M.               | Horticulture                     |
| Beckwith, JoAnn                    | Resource Development             |
| Beede, David <sup>5</sup>          | Animal Science                   |
| Behe, Bridget K.                   | Horticulture                     |
| Bell, Thomas G.                    | Veterinary Pathology             |
| Bence, James R. <sup>6</sup>       | Fisheries and Wildlife           |
| Benning, Christoph                 | Biochemistry                     |
| Bennink, Maurice R.                | Food Science and Human Nutrition |
| Benson, Margaret                   | Animal Science                   |
| Berglund, Kris A.                  | Agricultural Engineering         |
| Bickert, William G.                | Agricultural Engineering         |
| Biernbaum, John A.                 | Horticulture                     |
| Bingen, R. James                   | Resource Development             |
| Bird, George W.                    | Entomology                       |
| Black, J. Roy                      | Agricultural Economics           |
| Bond, Jenny T.                     | Food Science and Human Nutrition |
| Booren, Alden M.                   | Food Science and Human Nutrition |
| Bourquin, Leslie D.                | Food Science and Human Nutrition |
| Boyd, Stephen A.                   | Crop and Soil Sciences           |
| Bremigan, Mary T. <sup>6</sup>     | Fisheries and Wildlife           |
| Breznak, John A.                   | Microbiology                     |
| Bristow, Catherine                 | Entomology                       |
| Bronstein, Daniel A.               | Resource Development             |
| Brook, Roger C.                    | Agricultural Engineering         |
| Bucholtz, Herbert F.               | Animal Science                   |
| Bughrara, Suleiman S. <sup>7</sup> | Crop and Soil Sciences           |
| Bursian, Steven                    | Animal Science                   |

| NAME                   | DEPARTMENT                          |
|------------------------|-------------------------------------|
| Burton, Jeanne L.      | Animal Science                      |
| Burton, Zachary F.     | Biochemistry                        |
| Busch, Lawrence M.     | Sociology                           |
| Bush, Guy L.           | Kellogg Biological Station          |
| Buskirk, Daniel        | Animal Science                      |
| Cameron, Arthur C.     | Horticulture                        |
| Campa, Henry III       | Fisheries and Wildlife              |
| Carlson, William H.    | Horticulture                        |
| Cash, Jerry N.         | Food Science and Human Nutrition    |
| Champness, Wendy C.    | Microbiology                        |
| Cheney, Laura L.       | Agricultural Economics              |
| Chenoweth, Wanda L.    | Food Science and Human Nutrition    |
| Chou, Karen            | Animal Science                      |
| Christenson, Donald R. | Crop and Soil Sciences              |
| Clarke, Robert         | Packaging                           |
| Coe, Paul H.           | Animal Science                      |
| Coon, Thomas G.        | Fisheries and Wildlife              |
| Copeland, Lawrence O.  | Crop and Soil Sciences              |
| Coussens, Paul M.      | Animal Science                      |
| Crawford, Eric W.      | Agricultural Economics              |
| Cregg, Bert M.         | Horticulture                        |
| Crum, James L.         | Crop and Soil Sciences              |
| Dazzo, Frank B.        | Microbiology                        |
| Dazzo, Frank B.        | Crop and Soil Sciences              |
| de Bruijn, Frans J.    | Plant Research Laboratory           |
| de Bruijn, Frans J.    | Microbiology                        |
| Dersch, Eckhart        | Resource Development                |
| de Zoeten, Gustaaf A.  | Botany and Plant Pathology          |
| Dickmann, Donald I.    | Forestry                            |
| DiFonzo, Christina D.  | Entomology                          |
| DiFonzo, Christina D.  | Center for Integrated Plant Systems |
| Dilley, David R.       | Horticulture                        |
| D'Itri, Frank M.       | Institute of Water Research         |
| Dong, Ke               | Entomology                          |
| Douches, David S.      | Crop and Soil Sciences              |
| Doumit, Matthew E.     | Animal Science                      |
| Doumit, Matthew E.     | Food Science and Human Nutrition    |
| Downes, Theron W.      | Packaging                           |
| Dukelow, W. Richard    | Animal Science                      |
| Dukelow, W. Richard    | Physiology                          |
| Edens, Thomas C.       | Resource Development                |



| NAME                             | DEPARTMENT                                 |
|----------------------------------|--|
| Edens, Thomas C.                 | Entomology                                 |
| Edson, Charles E. <sup>7</sup>   | Horticulture                               |
| Eicher, Carl K.                  | Agricultural Economics                     |
| Ellis, Boyd G.                   | Crop and Soil Sciences                     |
| Epperson, Bryan K.               | Forestry                                   |
| Ernst, Catherine W.              | Animal Science                             |
| Erskine, Ronald J.               | Large Animal Clinical Sciences             |
| Ferris, Theodore A.              | Animal Science                             |
| Flore, James A.                  | Horticulture                               |
| Fogwell, Ralph L.                | Animal Science                             |
| Foster, Eunice F.                | Crop and Soil Sciences                     |
| Fraker, Pamela J.                | Food Science and Human Nutrition           |
| Fraker, Pamela J.                | Biochemistry                               |
| Freed, Russell D.                | Crop and Soil Sciences                     |
| Fried, Jeremy S.                 | Forestry                                   |
| Fulbright, Dennis W.             | Botany and Plant Pathology                 |
| Gage, Douglas A.                 | Biochemistry                               |
| Gage, Stuart H.                  | Entomology                                 |
| Garling, Donald L.               | Fisheries and Wildlife                     |
| Gerrish, John B.                 | Agricultural Engineering                   |
| Giacin, Jack R.                  | Packaging                                  |
| Giesy, John P.                   | National Food Safety and Toxicology Center |
| Gomez-Duran, Charles O.          | Large Animal Clinical Sciences             |
| Grooms, Daniel L.                | Large Animal Clinical Sciences             |
| Grumet, Rebecca                  | Horticulture                               |
| Gut, Larry                       | Entomology                                 |
| Guyer, Daniel E.                 | Agricultural Engineering                   |
| Hammerschmidt, Raymond           | Botany and Plant Pathology                 |
| Hancock, James F.                | Horticulture                               |
| Hanson, Eric J.                  | Horticulture                               |
| Hanson, Steven D.                | Agricultural Economics                     |
| Harkema, Jack                    | Veterinary Pathology                       |
| Harris, Craig K.                 | Sociology                                  |
| Harsh, Stephen B.                | Agricultural Economics                     |
| Hart, James B., Jr.              | Forestry                                   |
| Hart, L. Patrick                 | Botany and Plant Pathology                 |
| Harwood, Richard R. <sup>2</sup> | Crop and Soil Sciences                     |
| Hausbeck, Mary K.                | Botany and Plant Pathology                 |
| Hausinger, Robert P.             | Microbiology                               |
| Hausinger, Robert P.             | Biochemistry                               |
| Hayes, Daniel B. <sup>6</sup>    | Fisheries and Wildlife                     |
| He, Sheng-Yang                   | Botany and Plant Pathology                 |
| Heins, Royal D.                  | Horticulture                               |
| Heinze, Kirk L.                  | ANR Education and Communication Systems    |
| Herd, Thomas H.                  | Large Animal Clinical Sciences             |



| NAME                           | DEPARTMENT                             |
|--------------------------------|--|
| Hernandez, Ruben J.            | Packaging                              |
| Herner, Robert C.              | Horticulture                           |
| Hill, Gretchen M.              | Animal Science                         |
| Hoehn, John P.                 | Agricultural Economics                 |
| Hoerr, Sharon M.               | Food Science and Human Nutrition       |
| Holecek, Donald F.             | Park, Recreation and Tourism Resources |
| Holland, Margo S.              | Veterinary Pathology                   |
| Holland, Robert E.             | Large Animal Clinical Sciences         |
| Hollingsworth, Rawle I.        | Biochemistry                           |
| Hollingsworth, Robert M.       | Entomology                             |
| Hord, Norman                   | Food Science and Human Nutrition       |
| Howe, Gregg A.                 | Plant Research Laboratory              |
| Howell, Gordon S.              | Horticulture                           |
| Huang, Zhiyong                 | Entomology                             |
| Iezzoni, Amy F.                | Horticulture                           |
| Imig, David R.                 | Family and Child Ecology               |
| Ireland, James J.              | Animal Science                         |
| Isaacs, Rufus <sup>7</sup>     | Entomology                             |
| Jacobs, Lee W.                 | Crop and Soil Sciences                 |
| Jarosz, Andrew M.              | Botany and Plant Pathology             |
| Johnson, Nan E.                | Sociology                              |
| Jones, Alan L.                 | Botany and Plant Pathology             |
| Jones, Michael L. <sup>6</sup> | Fisheries and Wildlife                 |
| Jump, Donald B.                | Physiology                             |
| Kaguni, Jon M.                 | Biochemistry                           |
| Kakela, Peter J.               | Resource Development                   |
| Kamdern, Donatien-Pascal       | Forestry                               |
| Kaneene, John B.               | Large Animal Clinical Sciences         |
| Kaplowitz, Michael C.          | Resource Development                   |
| Keefe, Dennis R.               | Family and Child Ecology               |
| Keith, Joanne G.               | Family and Child Ecology               |
| Kells, James J., Jr.           | Crop and Soil Sciences                 |
| Kelly, James D.                | Crop and Soil Sciences                 |
| Kielbaso, Julian J.            | Forestry                               |



| NAME                            | DEPARTMENT                             |
|---------------------------------|--|
| Kirk, William W. <sup>7</sup>   | Botany and Plant Pathology             |
| Klug, Michael J.                | Microbiology                           |
| Knezek, Bernard D.              | Crop and Soil Sciences                 |
| Kobe, Richard K.                | Forestry                               |
| Kroos, Lee R.                   | Biochemistry                           |
| Landis, Douglas A.              | Entomology                             |
| Lee, Julian J. L.               | Packaging                              |
| Leefers, Larry A.               | Forestry                               |
| Leep, Richard H.                | Crop and Soil Sciences                 |
| Lenski, Richard E. <sup>3</sup> | Crop and Soil Sciences                 |
| Li, Weiming <sup>6</sup>        | Fisheries and Wildlife                 |
| Linz, John E.                   | Food Science and Human Nutrition       |
| Liu, Jianguo <sup>6</sup>       | Fisheries and Wildlife                 |
| Lloyd, James W.                 | Agricultural Economics                 |
| Loudon, Theodore L.             | Agricultural Engineering               |
| Lownds, Norman K.               | Horticulture                           |
| Lupi Jr., Frank <sup>6</sup>    | Fisheries and Wildlife                 |
| Lupi Jr., Frank <sup>6</sup>    | Agricultural Economics                 |
| Maes, Roger K.                  | Microbiology                           |
| Mao, Ivan Ling                  | Animal Science                         |
| Marks, Bradley P.               | Agricultural Engineering               |
| Maurer, Brian A. <sup>6</sup>   | Fisheries and Wildlife                 |
| McCullough, Deborah G.          | Entomology                             |
| McDonough, Maureen H.           | Forestry                               |
| Melakeberhan, Haddish           | Entomology                             |
| Merritt, Richard W.             | Entomology                             |
| Millenbah, Kelly F.             | Fisheries and Wildlife                 |
| Miller, James R.                | Entomology                             |
| Mokma, Delbert L.               | Crop and Soil Sciences                 |
| Myers, Robert S.                | Agricultural Economics                 |
| Nair, Muraleedharan G.          | Horticulture                           |
| Nelson, Charles M.              | Park, Recreation and Tourism Resources |
| Ng, Perry K. W.                 | Food Science and Human Nutrition       |
| Nielsen, Brian D.               | Animal Science                         |
| Norris, Patricia E.             | Resource Development                   |
| Norris, Patricia E.             | Agricultural Economics                 |
| Northcott, William J.           | Agricultural Engineering               |
| Oehmke, James F.                | Agricultural Economics                 |
| Ofoli, Robert Y.                | Food Science and Human Nutrition       |
| Ohlrogge, John B.               | Botany and Plant Pathology             |
| Olsen, Larry                    | Entomology                             |
| Orth, Michael                   | Animal Science                         |
| Osburn, Wesley N.               | Food Science and Human Nutrition       |
| Osburn, Wesley N.               | Animal Science                         |
| Padgett, George A.              | Veterinary Pathology                   |
| Patterson, Jon S.               | Veterinary Pathology                   |

| NAME                         | DEPARTMENT                             |
|------------------------------|--|
| Paul, Eldor A.               | Crop and Soil Sciences                 |
| Penner, Donald               | Crop and Soil Sciences                 |
| Perry, Ronald L.             | Horticulture                           |
| Person, Howard L.            | Agricultural Engineering               |
| Pestka, James J.             | Food Science and Human Nutrition       |
| Peterson, H. Christopher     | Agricultural Economics                 |
| Peyton, R. Benny             | Fisheries and Wildlife                 |
| Pierce, Francis J.           | Crop and Soil Sciences                 |
| Poff, Ken                    | Botany and Plant Pathology             |
| Potter-Witter, Karen L.      | Forestry                               |
| Prather, L. Alan             | Botany and Plant Pathology             |
| Preiss, Jack                 | Biochemistry                           |
| Prince, Harold H.            | Fisheries and Wildlife                 |
| Propst, Dennis B.            | Park, Recreation and Tourism Resources |
| Pursley, James R.            | Animal Science                         |
| Pysarchik, Dawn I.           | Human Environment and Design           |
| Raikhel, Alexander S.        | Entomology                             |
| Ramm, Carl W.                | Forestry                               |
| Raper, Kellie K.             | Agricultural Economics                 |
| Reddy, C. Adinarayana        | Microbiology                           |
| Renner, Karen A.             | Crop and Soil Sciences                 |
| Ricks, Donald J.             | Agricultural Economics                 |
| Ritchie, Harlan D.           | Animal Science                         |
| Ritchie, Joe T. <sup>4</sup> | Crop and Soil Sciences                 |
| Roberson, Kevin D.           | Animal Science                         |
| Robertson, G. Philip         | Crop and Soil Sciences                 |
| Robinson, Norman E.          | Large Animal Clinical Sciences         |
| Robison, Lindon J.           | Agricultural Economics                 |
| Rogers, John N. III          | Crop and Soil Sciences                 |
| Romsos, Dale R.              | Food Science and Human Nutrition       |
| Rook, Joseph S.              | Large Animal Clinical Sciences         |
| Rosenbaum, Rene P.           | Resource Development                   |
| Rowe, D. Bradley             | Horticulture                           |
| Rozeboom, Dale               | Animal Science                         |
| Rudy, Alan P.                | Sociology                              |
| Rugh, Clayton L.             | Crop and Soil Sciences                 |
| Rust, Steven                 | Animal Science                         |
| Ryser, Elliott T.            | Food Science and Human Nutrition       |
| Ryser, Elliott T.            | Animal Science                         |
| Safir, Gene R.               | Botany and Plant Pathology             |
| Sang, Tao                    | Botany and Plant Pathology             |
| Schiarnberg, Lawrence R.     | Family and Child Ecology               |
| Schilder, Annemiek C.        | Botany and Plant Pathology             |
| Schindler, Melvin S.         | Biochemistry                           |
| Schmid, A. Allan             | Agricultural Economics                 |
| Schmidt, Thomas M.           | Microbiology                           |



| NAME                          | DEPARTMENT                              |
|-------------------------------|---|
| Schroeder, Joseph J.          | Food Science and Human Nutrition        |
| Schultink, Gerhardus          | Resource Development                    |
| Schutzki, Robert E.           | Horticulture                            |
| Schwab, Gerald D.             | Agricultural Economics                  |
| Schweikhardt, David B.        | Agricultural Economics                  |
| Scriber, J. Mark              | Entomology                              |
| Scribner, Kim T. <sup>6</sup> | Fisheries and Wildlife                  |
| Sears, Barbara B.             | Botany and Plant Pathology              |
| Sears, Phillip M.             | Large Animal Clinical Sciences          |
| Segerlind, Larry J.           | Agricultural Engineering                |
| Singh, Sher Paul              | Packaging                               |
| Sink, Kenneth C.              | Horticulture                            |
| Slocum, Ann C.                | Human Environment and Design            |
| Smith, Denise M.              | Food Science and Human Nutrition        |
| Smith, George W.              | Animal Science                          |
| Smitley, David R.             | Entomology                              |
| Smucker, A.J.M.               | Crop and Soil Sciences                  |
| Song, Won O.                  | Food Science and Human Nutrition        |
| Sontag, M. Suzanne            | Human Environment and Design            |
| Soranno, Patricia A.          | Fisheries and Wildlife                  |
| Staatz, John S.               | Agricultural Economics                  |
| Steffe, James F.              | Food Science and Human Nutrition        |
| Steffe, James F.              | Agricultural Engineering                |
| Stehr, Frederick W.           | Entomology                              |
| Sternquist, Brenda J.         | Human Environment and Design            |
| Strasburg, Gale M.            | Food Science and Human Nutrition        |
| Straw, Barbara E.             | Large Animal Clinical Sciences          |
| Stynes, Daniel J.             | Park, Recreation and Tourism Resources  |
| Surbrook, Truman C.           | Agricultural Engineering                |
| Suvedi, Murari                | ANR Education and Communication Systems |
| Swinton, Scott M.             | Agricultural Economics                  |
| Tempelman, Robert             | Animal Science                          |
| Teppen, Brian J.              | Crop and Soil Sciences                  |
| Thelen, Kurt D.               | Crop and Soil Sciences                  |
| Thiem, Suzanne                | Entomology                              |
| Thomashow, Michael F.         | Crop and Soil Sciences                  |
| Thomashow, Michael F.         | Microbiology                            |
| Tiedje, James M.              | Microbiology                            |
| Tiedje, James M.              | Crop and Soil Sciences                  |
| Trail, Frances                | Botany and Plant Pathology              |
| Triezenberg, Steven J.        | Biochemistry                            |
| Trottier, Nathalie            | Animal Science                          |
| Tucker, H. Allen              | Animal Science                          |
| Ustunol, Zeynep               | Food Science and Human Nutrition        |
| VandeHaar, Michael            | Animal Science                          |

| NAME                             | DEPARTMENT                                 |
|----------------------------------|--|
| Vanderpool, Christopher K.       | Sociology                                  |
| Vander Stoep, Gail A.            | Park, Recreation and Tourism Resources     |
| Van Ee, Gary R.                  | Agricultural Engineering                   |
| van Nocker, Steven R.            | Horticulture                               |
| van Ravenswaay, Eileen O.        | Agricultural Economics                     |
| Vargas, Joseph M., Jr.           | Botany and Plant Pathology                 |
| Velicer, Leland F.               | Microbiology                               |
| von Bernuth, Robert D.           | Agricultural Engineering                   |
| Walker, Edward D.                | Entomology                                 |
| Walker, Rosemary A.              | Family and Child Ecology                   |
| Walters, Michael B. <sup>6</sup> | Forestry                                   |
| Walton, Jonathan D.              | Plant Research Laboratory                  |
| Wang, John L.                    | Biochemistry                               |
| Ward, Richard W.                 | Crop and Soil Sciences                     |
| Warncke, Darryl D.               | Crop and Soil Sciences                     |
| Watson, J. Throck                | Biochemistry                               |
| Weatherspoon, Dave D.            | Agricultural Economics                     |
| Weber, Michael T.                | Agricultural Economics                     |
| Weber, Miriam S.                 | Animal Science                             |
| Whims, Fred R.                   | ANR Education and Communication Systems    |
| Whipple, Judith M.               | Agricultural Economics                     |
| Widders, Irvin E.                | Horticulture                               |
| Winterstein, Scott R.            | Fisheries and Wildlife                     |
| Witter, Scott G.                 | Resource Development                       |
| Wolf, Christopher A.             | Agricultural Economics                     |
| Yokoyama, Melvin T.              | Animal Science                             |
| Zabadal, Thomas J.               | Horticulture                               |
| Zabik, Mary E.                   | Food Science and Human Nutrition           |
| Zabik, Matthew J.                | National Food Safety and Toxicology Center |
| Zabik, Matthew J.                | Entomology                                 |
| Zacharewski, Timothy R.          | National Food Safety and Toxicology Center |
| Zandstra, Bernard H.             | Horticulture                               |
| Zanella, Adroaldo                | Animal Science                             |
| Zile, Maija H.                   | Food Science and Human Nutrition           |

<sup>1</sup> Elton Smith Endowed Chair

<sup>2</sup> C.S. Mott Distinguished Professor of Sustainable Agriculture

<sup>3</sup> Hannah Professor for Microbial Ecology and Plant Sciences

<sup>4</sup> Nowlin Professor for Water Research (50 percent of the appointment is paid by the endowment)

<sup>5</sup> Clinton Meadows Chair

<sup>6</sup> Partnerships for Ecosystem Research and Management (PERM) positions with salary funded by the Michigan Department of Natural Resources

<sup>7</sup> GREEN (Generating Research and Extension to meet Economic and Environmental Needs) appointed faculty



# MAES Scientists and Projects by Department

The names listed here represent faculty members who have an MAES appointment and are in the tenure stream as of 10-1-99. Faculty members with dual MAES appointments are listed in both of the departments in which they serve.

## SCIENTISTS

MAES = Michigan Agricultural Experiment Station  
MSUE = Michigan State University Extension  
Joint = Joint appointment in an MAES-affiliated College or Department

12 = Professor  
13 = Associate Professor  
14 = Assistant Professor

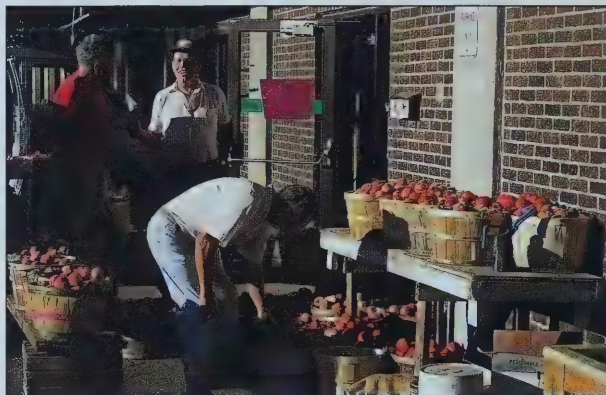
## PROJECTS

Projects listed are as of 10-1-99.

\*Signifies Regional Research Project

## ANR Education and Communication Systems

Phone: 355-6580



Kirk L. Heinze, Acting Chair

### FACULTY

|                 | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST                    |
|-----------------|------|-------------|-------------|-------------|-------------------------------------|
| Heinze, Kirk L. | 13   | 0.20        | 0.00        | 0.80        | Marketing Communication             |
| Suvedi, Murari  | 13   | 0.25        | 0.50        | 0.25        | Program Evaluation                  |
| Whims, Fred R.  | 12   | 0.12        | 0.40        | 0.48        | Extension Education/Rural Education |
| <b>TOTALS:</b>  |      | <b>0.57</b> | <b>0.90</b> | <b>1.53</b> |                                     |

### PROJECTS

|           |   |            |
|-----------|---|------------|
| MICL03316 | Assessing Retailer/Consumer Perceptions and Use of Michigan-Produced Commodities                  | Heinze, K. |
| MICL03372 | Evaluation of Area of Expertise (AOE) Team Approach to Applied Research and Extension in Michigan | Suvedi, M. |

## Agricultural Economics

Phone: 355-4563



Larry G. Hamm, Chair

### FACULTY

|                               | RANK | MAES | MSUE | JOINT | AREA OF INTEREST              |
|-------------------------------|------|------|------|-------|-------------------------------|
| Batie, Sandra S. <sup>1</sup> | 12   | 0.60 | 0.20 | 0.20  | Food and Agriculture Policy   |
| Black, J. Roy                 | 12   | 0.80 | 0.00 | 0.20  | Farm Management               |
| Cheney, Laura L.              | 14   | 0.50 | 0.50 | 0.00  | Livestock Industry Management |
| Crawford, Eric W.             | 12   | 0.40 | 0.35 | 0.25  | International Development     |
| Eicher, Carl K.               | 12   | 0.50 | 0.00 | 0.50  | International Development     |
| Hanson, Steven D.             | 13   | 0.80 | 0.00 | 0.20  | Agricultural Finance          |
| Harsh, Stephen B.             | 12   | 0.20 | 0.65 | 0.15  | Farm Management               |



# Agricultural Economics (continued)

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MAES SCIENTISTS AND PROJECTS BY DEPARTMENT

|                                      | RANK | MAES         | MSUE         | JOINT        | AREA OF INTEREST                                   |
|--------------------------------------|------|--------------|--------------|--------------|--|
| Hoehn, John P.                       | 12   | 0.70         | 0.00         | 0.30         | Natural Resources & Environmental Economics        |
| Lloyd, James W.                      | 12   | 0.20         | 0.00         | 0.80         | Livestock Production/Health Management/Food Safety |
| Lupi Jr., Frank <sup>6</sup>         | 14   | 0.15         | 0.42         | 0.43         | Fisheries & Wildlife Economics                     |
| Myers, Robert S.                     | 12   | 0.80         | 0.00         | 0.20         | International Trade & Price Analysis               |
| Norris, Patricia E.                  | 13   | 0.12         | 0.30         | 0.58         | Land Use Management/Public Resource Economics      |
| Oehmke, James F.                     | 13   | 0.75         | 0.00         | 0.25         | Price Analysis & Research Policy                   |
| Peterson, H. Christopher             | 13   | 0.40         | 0.00         | 0.60         | Food and Agribusiness Management                   |
| Raper, Kellie K.                     | 14   | 0.75         | 0.00         | 0.25         | Livestock Industry Marketing Economist             |
| Ricks, Donald J.                     | 12   | 0.20         | 0.70         | 0.10         | Food System Marketing                              |
| Robison, Lindon J.                   | 12   | 0.65         | 0.00         | 0.35         | Production Economics                               |
| Schmid, A. Allan                     | 12   | 0.60         | 0.00         | 0.40         | Land Economics/Public Policy                       |
| Schwab, Gerald D.                    | 12   | 0.20         | 0.50         | 0.30         | Farm Management                                    |
| Schweikhardt, David B.               | 13   | 0.25         | 0.40         | 0.35         | Food, Agricultural & Trade Policy                  |
| Staatz, John S.                      | 12   | 0.25         | 0.00         | 0.75         | International Development                          |
| Swinton, Scott M.                    | 13   | 0.70         | 0.00         | 0.30         | Production Economics                               |
| van Ravenswaay, Eileen O.            | 12   | 0.75         | 0.00         | 0.25         | Environmental Economics & Public Policy            |
| Weatherspoon, Dave D.                | 14   | 0.40         | 0.00         | 0.60         | Food & Agribusiness Management                     |
| Weber, Michael T.                    | 12   | 0.80         | 0.00         | 0.20         | International Development                          |
| Whipple, Judith M.                   | 13   | 0.30         | 0.20         | 0.50         | Food & Agribusiness Management                     |
| Wolf, Christopher A.                 | 14   | 0.50         | 0.50         | 0.00         | Dairy Firm Management Economics                    |
| <b>TOTALS:</b>                       |      | <b>13.27</b> | <b>4.72</b>  | <b>9.01</b>  |  |
| <i>Adjustment for PERM Positions</i> |      | <i>-0.15</i> | <i>-0.42</i> | <i>-0.43</i> |  |
| <b>ADJUSTED TOTALS</b>               |      | <b>13.12</b> | <b>4.30</b>  | <b>8.58</b>  |  |

## PROJECTS

|            |  |                    |
|------------|--|--------------------|
| MICL01518* | Benefits and Costs of Resource Policies Affecting Public and Private Land                                      | Hoehn, J.          |
| MICL01519* | Private Strategies, Public Policies and Food System Performance  | van Ravenswaay, E. |
| MICL01530* | Fruit and Vegetable Supply-Chain Management, Innovations and Competitiveness                                   | Ricks, D.          |
| MICL01625  | Financial Decision Making and Investment in Agriculture  | Hanson, S.         |
| MICL01635  | Collective Action in Agriculture, Natural Resources and Rural Development                                      | Schmid, A.         |
| MICL01642* | Impacts of Structural Change in the Dairy Industry   | Wolf, C.           |
| MICL01666* | Impact Analyses and Decision Strategies for Agricultural Research  | Oehmke, J.         |
| MICL01732  | Political Economy of National and International Agricultural Policies and Policy Decision Processes            | Schweikhardt, D.   |
| MICL01744  | Agricultural Economics Research on International Agricultural Development and Environmental Issues             | Eicher, C.         |
| MICL01770  | Economic Analysis of Public Policies Affecting the Performance of Michigan Agriculture                         | Batie, S.          |
| MICL01788  | Economic Analysis of Tactical and Operational Decisions on Farms and Design/Development of Information Systems | Harsh, S.          |
| MICL01790  | Structural Adjustments in Michigan's Pork and Beef Sectors   | Black, J.          |
| MICL01815  | The Political Economy of U.S. Agricultural Research, Commodity and Trade Policy                                | Oehmke, J.         |
| MICL01844  | Risk Analysis and Management in U.S. Agriculture   | Myers, R.          |
| MICL01850  | The Role of Information and Market Transactions in Land Use Policy   | Norris, P.         |
| MICL01865  | Role of Information and Transactions Costs in Coordination of Global Food Systems                              | Staatz, J.         |

# Agricultural Economics (continued)

|            |  |              |
|------------|--|--------------|
| MICL01889  | Social Capital, Terms of Trade and the Internalization of Externalities                                      | Robison, L.  |
| MICL01891* | Financing Agriculture and Rural America: Issues of Policy, Structure and Technical Change                    | Hanson, S.   |
| MICL01905  | Agricultural Production Economics and Environmental Risk Management  | Swinton, S.  |
| MICL01925  | Agribusiness Competitiveness: Strategies for Vertical Coordination and Customer Responsiveness               | Peterson, H. |
| MICL03333  | Improved Marketing and Competitiveness for Michigan Fruit Industries   | Ricks, D.    |
| MICL03356  | Economics of Vertical Coordination and Intensive Production in Michigan's Livestock Industries               | Martin, L.   |
| MICL03381  | Strategic Management in Agribusiness Using Key Performance Indicators  | Lloyd, J.    |
| MICL03384  | Assessing the Economic Structure, Performance, Visibility and Competitiveness of the Michigan Dairy Industry | Wolf, C.     |
| MICL03385  | The Impact of Efficient Consumer Response on Michigan Food Manufacturers and Retailers                       | Whipple, J.  |
| MICL03387  | Agricultural Economics Research on International Agricultural Development and the Environment                | Weber, M.    |
| MICL08201  | Enhancing Rural Economies Through Comprehensive Extension, Research and Partnering Approaches                | Moser, C.    |

## Agricultural Engineering

Phone: 355-4720



Ajit K. Srivastava,  
Chair

### FACULTY

|                        | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST                                  |
|------------------------|------|-------------|-------------|-------------|---|
| Bakker-Arkema, Fred W. | 12   | 0.65        | 0.00        | 0.35        | Grain Dry Storage                                 |
| Berglund, Kris A.      | 12   | 0.49        | 0.00        | 0.51        | Biotechnology/Food Engineering                    |
| Bickert, William G.    | 12   | 0.20        | 0.80        | 0.00        | Livestock Facilities/Environment                  |
| Brook, Roger C.        | 12   | 0.25        | 0.75        | 0.00        | Postharvest Handling, Storage, Drying             |
| Gerrish, John B.       | 12   | 0.40        | 0.00        | 0.60        | Electronics/Odor Control                          |
| Guyer, Daniel E.       | 13   | 0.25        | 0.75        | 0.00        | Fruit/Vegetable Storage/Handling                  |
| Loudon, Theodore L.    | 12   | 0.30        | 0.70        | 0.00        | Irrigation/Waste Water Treatment                  |
| Marks, Bradley P.      | 13   | 0.60        | 0.00        | 0.40        | Biosystems Engineer                               |
| Northcott, William J.  | 14   | 0.40        | 0.00        | 0.60        | Natural Resources Engineer                        |
| Person, Howard L.      | 13   | 0.30        | 0.70        | 0.00        | Agricultural Structures/Livestock/Waste Treatment |
| Segerlind, Larry J.    | 12   | 0.35        | 0.00        | 0.65        | Finite Element Analysis/Structures                |
| Steffe, James F.       | 12   | 0.35        | 0.00        | 0.65        | Food Engineering/Rheology                         |
| Surbrook, Truman C.    | 12   | 0.25        | 0.00        | 0.75        | Electrical Technology /Stray Voltage              |
| Van Ee, Gary R.        | 12   | 0.65        | 0.00        | 0.35        | Chemical Application/Power & Machinery            |
| von Bernuth, Robert D. | 12   | 0.36        | 0.26        | 0.38        | Manure Management                                 |
| <b>TOTALS:</b>         |      | <b>5.80</b> | <b>3.96</b> | <b>5.24</b> |   |

### PROJECTS

|            |  |            |
|------------|--|------------|
| MICL01245* | Improvement of Thermal Processes for Foods   | Steffe, J. |
| MICL01581  | Value-Added Quality Control Techniques in the Postharvest Stages of Fruit and Vegetable Products   | Guyer, D.  |
| MICL01676* | Technology and Principles for Assessing and Retaining Postharvest Quality of Fruits and Vegetables | Guyer, D.  |
| MICL01767  | Development of Chemical Application Technology for Agribusiness                                    | Van Ee, G. |



|            |   |                   |
|------------|---|-------------------|
| MICL01777  | Engineering for Food Quality and Safety   | Brook, R.         |
| MICL01784  | Marketing and Delivery of Quality Cereals and Oilseeds  | Bakker-Arkema, F. |
| MICL01787  | Improvement of Small-Scale Decentralized and Onsite Wastewater Treatment and Disposal               | Loudon, T.        |
| MICL01794  | Analysis and Characterization of Biosystems   | Gerrish, J.       |
| MICL01799  | Designing Dairy Facilities to Enhance Management and to Meet Animals' Needs                         | Bickert, W.       |
| MICL01862  | Neutral-To-Earth Voltage Reduction on Livestock Farms   | Surbrook, T.      |
| MICL01883  | Facilitating Beneficial Use of Livestock Manure   | Person, H.        |
| MICL01888* | Animal Manure and Waste Utilization, Treatment and Nuisance Avoidance for a Sustainable Agriculture | von Bernuth, R.   |
| MICL01914  | Irrigation and Waste Management Research in a Systems Context                                       | von Bernuth, R.   |
| MICL01930  | Computational Methods in Biosystems Engineering   | Segerlind, L.     |
| MICL01935  | Laser Spectroscopy for Analysis of Crystallization Processes  | Berglund, K.      |
| MICL07642  | Bioprocessing for Utilization of Agricultural Raw Materials   | Berglund, K.      |
| MICL08180  | Rheology and Protein Chemistry of "Undeveloped" Dough   | Steffe, J.        |



Photo by Ann Grimes

## Animal Science

Phone: 355-8383


Maynard G. Hogberg,  
Chair

### FACULTY

|                           | RANK | MAES | MSUE | JOINT | AREA OF INTEREST                             |
|---------------------------|------|------|------|-------|--|
| Allen, Michael            | 12   | 0.50 | 0.50 | 0.00  | Forage Nutrition                             |
| Aulerich, Richard J.      | 12   | 0.75 | 0.25 | 0.00  | Fur-bearing Animals/Nutrition/<br>Toxicology |
| Balander, Richard J.      | 13   | 0.40 | 0.00 | 0.60  | Avian Physiology/Reproduction                |
| Banks, Bobby D.           | 12   | 0.25 | 0.00 | 0.75  | Animal Genetics                              |
| Bates, Ronald O.          | 14   | 0.20 | 0.80 | 0.00  | Swine Genetics/Management                    |
| Beede, David <sup>5</sup> | 12   | 0.50 | 0.40 | 0.10  | Dairy Nutrition/Dairy Management             |
| Benson, Margaret          | 12   | 0.20 | 0.50 | 0.30  | Ruminant Nutrition/Sheep                     |
| Bucholtz, Herbert F.      | 12   | 0.15 | 0.70 | 0.15  | Dairy Nutrition/Management                   |
| Bursian, Steven           | 12   | 0.85 | 0.00 | 0.15  | Avian Physiology/Toxicology                  |
| Burton, Jeanne L.         | 14   | 0.80 | 0.00 | 0.20  | Molecular Genetics/Dairy Cattle              |
| Buskirk, Daniel           | 14   | 0.50 | 0.50 | 0.00  | Ruminant Nutrition/Beef                      |
| Chou, Karen               | 13   | 0.80 | 0.00 | 0.20  | Toxicology                                   |
| Coe, Paul H.              | 13   | 0.20 | 0.00 | 0.80  | Animal Health                                |
| Coussens, Paul M.         | 13   | 0.80 | 0.00 | 0.20  | Molecular Biology                            |
| Doumit, Matthew E.        | 14   | 0.25 | 0.00 | 0.75  | Meat Science/Muscle Biology                  |
| Dukelow, W. Richard       | 12   | 0.25 | 0.00 | 0.75  | Reproductive Physiology                      |

|                     | RANK | MAES         | MSUE        | JOINT        | AREA OF INTEREST                 |
|---------------------|------|--------------|-------------|--------------|----------------------------------|
| Ernst, Catherine W. | 14   | 0.80         | 0.00        | 0.20         | Meat Animal Genetics             |
| Ferris, Theodore A. | 12   | 0.20         | 0.80        | 0.00         | Dairy Genetics                   |
| Fogwell, Ralph L.   | 12   | 0.30         | 0.50        | 0.20         | Physiology                       |
| Hill, Gretchen M.   | 13   | 0.75         | 0.00        | 0.25         | Swine Nutrition                  |
| Ireland, James J.   | 12   | 0.95         | 0.00        | 0.05         | Physiology                       |
| Mao, Ivan Ling      | 12   | 0.95         | 0.00        | 0.05         | Dairy Genetics                   |
| Nielsen, Brian D.   | 14   | 0.60         | 0.00        | 0.40         | Equine Exercise Physiology       |
| Orth, Michael       | 14   | 0.80         | 0.00        | 0.20         | Turkey Nutrition/Growth Biology  |
| Osburn, Wesley N.   | 14   | 0.25         | 0.00        | 0.75         | Meat Science                     |
| Pursley, James R.   | 14   | 0.20         | 0.80        | 0.00         | Reproductive Management          |
| Ritchie, Harlan D.  | 12   | 0.10         | 0.90        | 0.00         | Beef Cattle Nutrition/Management |
| Roberson, Kevin D.  | 14   | 0.35         | 0.65        | 0.00         | Poultry Nutrition/Management     |
| Rozeboom, Dale      | 13   | 0.15         | 0.60        | 0.25         | Swine Nutrition/Management       |
| Rust, Steven        | 12   | 0.50         | 0.50        | 0.00         | Beef Feedlot Nutrition           |
| Ryser, Elliott T.   | 14   | 0.17         | 0.00        | 0.83         | Dairy Manufacturing/Microbiology |
| Smith, George W.    | 14   | 0.75         | 0.00        | 0.25         | Reproductive Physiology          |
| Tempelman, Robert   | 14   | 0.50         | 0.00        | 0.50         | Statistics                       |
| Trottier, Nathalie  | 14   | 0.75         | 0.00        | 0.25         | Swine Nutrition/Management       |
| Tucker, H. Allen    | 12   | 0.80         | 0.00        | 0.20         | Physiology/Lactation             |
| VandeHaar, Michael  | 13   | 0.65         | 0.00        | 0.35         | Dairy Nutrition                  |
| Weber, Miriam S.    | 14   | 0.30         | 0.00        | 0.70         | Dairy Management                 |
| Yokoyama, Melvin T. | 12   | 0.85         | 0.00        | 0.15         | Animal Nutrition/Microbiology    |
| Zanella, Adroaldo   | 14   | 0.75         | 0.00        | 0.25         | Ethology/Stress Physiology       |
| <b>TOTALS:</b>      |      | <b>19.82</b> | <b>8.40</b> | <b>10.78</b> |                                  |

## PROJECTS

|            |  |               |
|------------|--|---------------|
| MICL01039  | Fur Animal Studies (Mink)  | Aulerich, R.  |
| MICL01156* | Management Systems for Improved Decision Making and Profitability of Dairy Herds                 | Beede, D.     |
| MICL01178  | New Breeding Strategies to Maximize the Efficiency of Dairy Cattle Improvement                   | Mao, I.       |
| MICL01182* | Molecular Mechanisms Regulating Skeletal Muscle Growth and Differentiation                       | Doumit, M.    |
| MICL01196* | Methods to Increase Reproductive Efficiency in Cattle  | Pursley, J.   |
| MICL01521* | Metabolic Relationships in Supply of Nutrients for Lactating Cows                                | VandeHaar, M. |
| MICL01573  | The Role of Inhibin in Bovine Reproduction   | Ireland, J.   |
| MICL01604  | Increasing Efficiency of Protein Production in Dairy Cattle                                      | VandeHaar, M. |
| MICL01622  | Environmental Chemical Influences on Reproduction  | Chou, K.      |
| MICL01643  | Microbial Ecology of Rumen, Gastrointestinal Tract, Ensiled Feeds and Livestock                  | Yokoyama, M.  |
| MICL01652* | Environmental and Economic Impacts of Nutrient Management on Dairy Forage Systems                | Allen, M.     |
| MICL01691* | Genetic Improvement of Cattle Using Molecular Genetic Information                                | Burton, J.    |
| MICL01727  | The Fate and Biological Effects of Xenobiotics in Animals  | Bursian, S.   |
| MICL01800  | Optimizing Nutrition and Management of Dry, Peripartum and Early Lactation Dairy Cows            | Beede, D.     |
| MICL01802  | Optimizing the Nutritional Utilization of Forages by Dairy Cattle                                | Allen, M.     |
| MICL01803  | Nutritional, Management and Other Applied Studies Using Poultry and Other Avian Species          | Balander, R.  |
| MICL01818* | Biophysical Models for Poultry Production Systems  | Rahn, A.      |
| MICL01822  | Advanced Biometrical Techniques for Genetic Inference in Livestock Populations                   | Tempelman, R. |
| MICL01823  | Methods to Enhance Decision Making by Dairy Producers and Artificial Insemination of Bull Studs  | Ferris, T.    |
| MICL01836  | Genetic Basis of Parturition-Induced Immunosuppression and Mastitis Susceptibility in Dairy Cows | Burton, J.    |



|            |   |              |
|------------|---|--------------|
| MICL01852  | Understanding Growth Plate Cartilage Turnover in Meat Producing Birds                               | Orth, M.     |
| MICL01853  | Assessment of Behavioral and Physiological Responses of Animals to Difficult Situations             | Zanella, A.  |
| MICL01854  | Optimizing Protein and Amino Acid Utilization of Growing Pigs and Gestating and Lactating Sows      | Trottier, N. |
| MICL01861  | Management of Athletic Horses to Reduce Musculoskeletal Injuries and Improve Performance            | Nielsen, B.  |
| MICL01873* | Positional and Functional Identification of Economically Important Genes in the Pig                 | Ernst, C.    |
| MICL01875  | Using Milk Yield to Schedule Insemination in Dairy Cows   | Fogwell, R.  |
| MICL01877  | Genetic Management and Control of Growth Carcass Merit and Quality                                  | Bates, R.    |
| MICL01879  | Pre- and Postharvest Processing Strategies to Improve the Value of Muscle Food Products             | Osburn, W.   |
| MICL01880  | Regulation of Skeletal Muscle Growth and Meat Quality   | Doumit, M.   |
| MICL01885* | Integration of Quantitative and Molecular Technologies for Genetic Improvement of Pigs              | Bates, R.    |
| MICL01890  | Mechanisms of Ovulation in Dairy Cattle   | Smith, G.    |
| MICL01913  | Impact of Growth and Lactation on the Nutritional Needs and Economic Viability of the Sheep Flock   | Benson, M.   |
| MICL01928* | Reproductive Performance in Domestic Ruminants  | Smith, G.    |
| MICL01929  | Identification and Evaluation of Genes Controlling Economically Important Traits in Pigs and Cattle | Ernst, C.    |
| MICL01931  | Molecular Mechanisms of Animal Disease I: PRRSV   | Coussens, P. |
| MICL01943  | Nutritional and Managerial Strategies to Minimize Phosphorus Excretion from Poultry                 | Roberson, K. |
| MICL03340  | Nutrition and Feeding Management for Michigan Dairy Herds   | Bucholtz, H. |
| MICL03360  | Feeding and Management Regimes for Efficient Utilization of Michigan Feedstuffs by Beef Cattle      | Buskirk, D.  |
| MICL03366  | Utilization of Genetic Resources for the Improvement of Livestock Populations                       | Banks, B.    |
| MICL03374  | Maximum Utilization of Michigan Grown Feedstuffs for Growing-Finishing Cattle                       | Rust, S.     |
| MICL06883  | The Use of <i>Propionibacterium</i> for Prevention of Lactic Acidosis                               | Rust, S.     |
| MICL06889  | Identification of PCR-RFLPs in Glucocorticoid Receptor Genes of Pedigreed Cattle                    | Burton, J.   |
| MICL06892  | Neuroendocrine Regulation of the Stress Response in Cattle  | Smith, G.    |
| MICL06896  | Glucosamine's Role in the Regulation of Metalloproteinases in Equine Cartilage                      | Orth, M.     |
| MICL06898  | Identification of Differentially Expressed Genes Regulated by Zinc Supplementation of Weaned Pigs   | Ernst, C.    |
| MICL08211  | Role of Matrix Metalloproteinases in Ovulation  | Smith, G.    |
| MICL08229  | Identification of Single-Nucleotide Polymorphisms in Pig Sequence-Tagged Sites                      | Ernst, C.    |

## Biochemistry

Phone: 353-0804



William L. Smith, Chair

### FACULTY

|                         | RANK | MAES | MSUE | JOINT | AREA OF INTEREST             |
|-------------------------|------|------|------|-------|------------------------------|
| Benning, Christoph      | 14   | 0.67 | 0.00 | 0.33  | Plant Biochemistry           |
| Burton, Zachary F.      | 13   | 0.20 | 0.00 | 0.80  | Molecular Biology            |
| Fraker, Pamela J.       | 12   | 0.30 | 0.00 | 0.70  | Immunology                   |
| Gage, Douglas A.        | 14   | 0.56 | 0.00 | 0.44  | Plant Biochemistry           |
| Hausinger, Robert P.    | 12   | 0.25 | 0.00 | 0.75  | Enzymology                   |
| Hollingsworth, Rawle I. | 12   | 0.25 | 0.00 | 0.75  | Renewable Resource Chemistry |
| Kaguni, Jon M.          | 12   | 0.58 | 0.00 | 0.42  | Molecular Biology            |
| Kroos, Lee R.           | 12   | 0.56 | 0.00 | 0.44  | Molecular Biology            |
| Preiss, Jack            | 12   | 0.25 | 0.00 | 0.75  | Starch Biochemistry          |

# Biochemistry (continued)

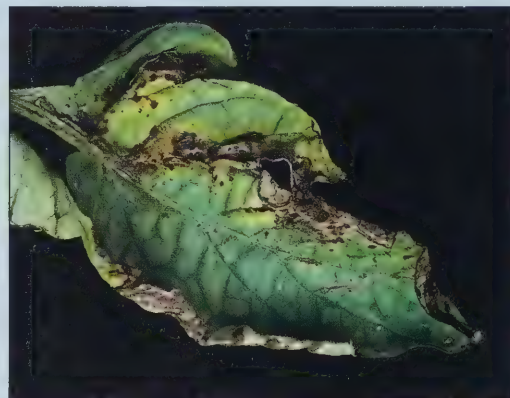
|                        | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST        |
|------------------------|------|-------------|-------------|-------------|-------------------------|
| Schindler, Melvin S.   | 12   | 0.35        | 0.00        | 0.65        | Cell Biology            |
| Triezenberg, Steven J. | 12   | 0.20        | 0.00        | 0.80        | Molecular Biology       |
| Wang, John L.          | 12   | 0.20        | 0.00        | 0.80        | Cell Biology            |
| Watson, J. Throck      | 12   | 0.50        | 0.00        | 0.50        | Analytical Biochemistry |
| <b>TOTALS:</b>         |      | <b>4.87</b> | <b>0.00</b> | <b>8.13</b> |                         |

## PROJECTS

|            |  |                 |
|------------|--|-----------------|
| MICL01290* | Regulation of Photosynthetic Processes   | Preiss, J.      |
| MICL01598  | Gene Regulation During Development of Soil Bacteria  | Kroos, L.       |
| MICL01601  | DNA Replication and its Regulation in <i>Escherichia coli</i>  | Kaguni, J.      |
| MICL01608  | Activation of Gene Expression by a Herpes Simplex Virion Protein                                     | Triezenberg, S. |
| MICL01610  | Functions of Transcription Factor IIF  | Burton, Z.      |
| MICL01614  | Interaction of <i>Rhizobium</i> with Soybean Cells   | Wang, J.        |
| MICL01781  | Mechanism of Aluminum Toxicity-Optical Trap Measurements of Cytoskeletal Dysfunction in Living Cells | Schindler, M.   |
| MICL01816  | Biosynthesis of the Plant Osmoprotectant Dimethylsulfoniopropionate (DMSP)                           | Gage, D.        |
| MICL01924  | Dietary Zinc — Its Effects on the Immune Response  | Fraker, P.      |
| MICL01940  | Regulation of Metabolism in Developing Seeds of <i>Arabidopsis</i>                                   | Benning, C.     |
| MICL08219  | Role of Oxylipins in the Regulation of Plant Defense   | Howe, G.        |
| MICL08225  | Genetic Engineering of Amylosaccharidases for Agricultural Bioprocessing                             | Zeikus, J.      |

# Botany and Plant Pathology

Phone: 355-4683



Raymond K.  
Hammerschmidt,  
Acting Chair

## FACULTY

|                        | RANK | MAES | MSUE | JOINT | AREA OF INTEREST   |
|------------------------|------|------|------|-------|--|
| Adams, Gerard C.       | 13   | 0.55 | 0.27 | 0.18  | Plant Pathology/Mycology   |
| Allison, Richard F.    | 13   | 0.75 | 0.00 | 0.25  | Plant Molecular Virology   |
| de Zoeten, Gustaaf A.  | 12   | 0.72 | 0.02 | 0.26  | Plant Pomology/Virology  |
| Fulbright, Dennis W.   | 12   | 0.83 | 0.00 | 0.17  | Plant Pathology/Plant Pathogen Genetics                          |
| Hammerschmidt, Raymond | 12   | 0.83 | 0.00 | 0.17  | Plant Pathology/Biochemistry/Physiology/Plant Disease Resistance |
| Hart, L. Patrick       | 12   | 0.40 | 0.50 | 0.10  | Plant Pathology/Field Crops                                      |
| Hausbeck, Mary K.      | 13   | 0.29 | 0.61 | 0.10  | Plant Pathology/Ornamentals, Vegetables & Greenhouse Crops       |
| He, Sheng-Yang         | 14   | 0.25 | 0.00 | 0.75  | Molecular Biology/Plant-Pathogen Interactions                    |



|                                       | RANK | MAES         | MSUE         | JOINT        | AREA OF INTEREST  |
|---------------------------------------|------|--------------|--------------|--------------|---|
| Jaros, Andrew M.                      | 13   | 0.75         | 0.00         | 0.25         | Plant Pathology/Pathogen Epidemiology                                     |
| Jones, Alan L.                        | 12   | 0.50         | 0.40         | 0.10         | Plant Pathology/Fruit Tree Crops  |
| Kirk, William W. <sup>7</sup>         | 14   | 0.45         | 0.45         | 0.10         | Plant Pathology/Vegetables/<br>Potatoes/Perennial Herbaceous Plants       |
| Ohlrogge, John B.                     | 12   | 0.84         | 0.00         | 0.16         | Plant Physiology/Biochemistry/<br>Molecular Biology/Plant Lipid Synthesis |
| Poff, Ken                             | 12   | 0.25         | 0.00         | 0.75         | Plant Physiology  |
| Prather, L. Alan                      | 14   | 0.25         | 0.00         | 0.75         | Plant Systematics   |
| Safir, Gene R.                        | 12   | 0.90         | 0.00         | 0.10         | Plant Pathology/Mycorrhizal Fungi   |
| Sang, Tao                             | 14   | 0.25         | 0.00         | 0.75         | Plant Systematics and Molecular<br>Evolution                              |
| Schilder, Annemiek C.                 | 14   | 0.45         | 0.45         | 0.10         | Plant Pathology/Small Fruits  |
| Sears, Barbara B.                     | 12   | 0.25         | 0.00         | 0.75         | Molecular Biology and Plant Organelle<br>Genetics                         |
| Trail, Frances                        | 14   | 0.27         | 0.00         | 0.73         | Host Pathogen Interactions  |
| Vargas, Joseph M., Jr.                | 12   | 0.26         | 0.49         | 0.25         | Plant Pathology/Diseases/Sod and Turf                                     |
| <b>TOTALS:</b>                        |      | <b>10.04</b> | <b>3.19</b>  | <b>6.77</b>  |   |
| <i>Adjustment for GREEN Positions</i> |      | <i>-0.45</i> | <i>-0.45</i> | <i>-0.10</i> |   |
| <b>ADJUSTED TOTALS</b>                |      | <b>9.59</b>  | <b>2.74</b>  | <b>6.67</b>  |   |

## PROJECTS

|            |  |                   |
|------------|--|-------------------|
| MICL01206* | Biocontrol of Soil-Borne Plant Pathogens   | Safir, G.         |
| MICL01259* | <i>Fusarium</i> Mycotoxins in Cereal Grains  | Hart, L.          |
| MICL01499  | Control and Utilization of VA Mycorrhizal Root Colonization  | Safir, G.         |
| MICL01533  | Genetic Engineering of Oilseed Crops   | Ohlrogge, J.      |
| MICL01562  | Physiology of Resistance and Induced Resistance to Disease in Potato                               | Hammerschmidt, R. |
| MICL01662  | Avirulent Fungal and Bacterial Plant Pathogens: Their Role and Fate in Plant Disease Epidemics     | Fulbright, D.     |
| MICL01673  | Biology and Control of Pathogens of Field Crops  | Hart, L.          |
| MICL01679  | <i>Plastome mutator</i> of <i>Oenothera</i> : A Nuclear Gene That Causes Chloroplast DNA Mutations | Sears, B.         |
| MICL01756* | Multidisciplinary Evaluation of New Apple Cultivars  | Jones, A.         |
| MICL01808  | Recombination Between Viral RNA and Transgenic Plant Transcripts                                   | Allison, R.       |
| MICL01827  | Complementation of Movement Function Between Genetic Components of Pea Enation Mosaic Virus        | de Zoeten, G.     |
| MICL01832  | Management of Turfgrass Diseases   | Vargas, J.        |
| MICL01843  | Cryptic Plant Pathogenic Fungi: Biology of Latent Pathogens in Symptomless Trees                   | Adams, G.         |
| MICL01896  | Phylogeny of the Rice Genus, <i>Oryza</i> , and Evolution of Rice Disease Resistance Genes         | Sang, T.          |
| MICL01907  | Development and Dispersal of Inoculum for the Wheat Head Scab Fungus, <i>Gibberella zeae</i>       | Trail, F.         |
| MICL01910  | Molecular Biology of Plant-Bacterial Interactions  | He, S.            |
| MICL01912  | Pathogen Population Biology as a Tool in Developing Disease Control Strategies                     | Jaros, A.         |
| MICL01922  | Plant Evolution and Conservation: The Role of Flower Form and Function                             | Prather, L.       |
| MICL01938  | The Relationship Between Phototropism and the Positioning of Leaves and Flowers                    | Poff, K.          |
| MICL03183  | Diseases of Tree Fruit Crops and Their Control   | Jones, A.         |
| MICL03377  | Diseases of Upland and Muck Vegetables and Transplants, Greenhouse Ornamentals and Their Control   |                   |
| MICL07636  | Controlling Fire Blight Disease of Apple Trees FY99  |                   |
| MICL08203  | Factors Affecting Recombination Frequency Between Plant Viruses and Viral Transgenes               |                   |
| MICL08212  | Production of Industrially Useful Monoenoic Fatty Acids in Transgenic Plants                       |                   |
| MICL08216  | Production of Acetylated Glycerides in Transgenic Oil Crops  |                   |

# Chemical Engineering

Phone: 355-5135

## PROJECTS

|           |   |
|-----------|---|
| MICL07621 | Bioprocessing for Utilization of Agricultural Raw Materials           |
| MICL08193 | Multiphase Biocatalysis Using Reversible Aphrons                      |
| MICL08215 | Condensed-Phase Catalytic Hydrogenation of Crop-Derived Organic Acids |

Berglund, K.  
Worden, R.  
Miller, D.

# Chemistry

Phone: 355-9715

## PROJECTS

|           |  |
|-----------|--|
| MICL08160 | Environmentally Compatible Synthesis of Value-Added Chemicals from D-Glucose |
| MICL08208 | Environmentally Compatible Synthesis of Value-Added Chemicals from D-Glucose |
| MICL08214 | Charge Separation and Stabilization in Chloroplast Photosystem II            |

Frost, J.  
Frost, J.  
Babcock, G.

# Crop and Soil Sciences

Phone: 355-0271



Photo by Bruce Fox



Taylor J. Johnston,  
Acting Chair

## FACULTY

|                        | RANK | MAES | MSUE | JOINT | AREA OF INTEREST                      |
|------------------------|------|------|------|-------|---------------------------------------|
| Baird, James H.        | 14   | 0.70 | 0.00 | 0.30  | Turfgrass Management                  |
| Boyd, Stephen A.       | 12   | 0.75 | 0.00 | 0.25  | Environmental Soil Chemistry          |
| Bughrara, Suleiman S.7 | 14   | 0.75 | 0.25 | 0.00  | Turfgrass Breeding and Genetics       |
| Christenson, Donald R. | 12   | 0.50 | 0.50 | 0.00  | Soil Fertility/Management             |
| Copeland, Lawrence O.  | 12   | 0.15 | 0.75 | 0.10  | Seed/Grain Technology                 |
| Crum, James L.         | 12   | 0.25 | 0.00 | 0.75  | Soil Class/Genesis/Turfgrass          |
| Ellis, Boyd G.         | 12   | 0.50 | 0.00 | 0.50  | Soil Chemistry                        |
| Dazzo, Frank B.        | 12   | 0.10 | 0.00 | 0.90  | Microbial Ecology                     |
| Douches, David S.      | 13   | 0.90 | 0.00 | 0.10  | Potato Breeding/Genetics              |
| Foster, Eunice F.      | 12   | 0.15 | 0.00 | 0.85  | Crop Physiology                       |
| Freed, Russell D.      | 12   | 0.50 | 0.00 | 0.50  | International Agronomy/Plant Breeding |



|                                       | RANK | MAES         | MSUE         | JOINT        | AREA OF INTEREST                                  |
|---------------------------------------|------|--------------|--------------|--------------|---|
| Harwood, Richard R. <sup>2</sup>      | 12   | 0.60         | 0.20         | 0.20         | Sustainable Agriculture                           |
| Jacobs, Lee W.                        | 12   | 0.50         | 0.50         | 0.00         | Environmental Waste Management                    |
| Kells, James J., Jr.                  | 12   | 0.25         | 0.60         | 0.15         | Weed Science                                      |
| Kelly, James D.                       | 12   | 0.75         | 0.00         | 0.25         | Dry Bean Breeding                                 |
| Knezek, Bernard D.                    | 12   | 0.50         | 0.00         | 0.50         | Micronutrient/Waste Utilization                   |
| Leep, Richard H.                      | 12   | 0.35         | 0.50         | 0.15         | Soil Fertility/Forage Management                  |
| Lenski, Richard E. <sup>3</sup>       | 12   | 0.40         | 0.00         | 0.60         | Microbial Ecology and Evolutionary Biology        |
| Mokma, Delbert L.                     | 12   | 0.50         | 0.15         | 0.35         | Soil Classification/Genesis                       |
| Paul, Eldor A.                        | 12   | 0.62         | 0.14         | 0.24         | Soil Microbiology                                 |
| Penner, Donald                        | 12   | 0.80         | 0.00         | 0.20         | Crop/Weed/Physiology                              |
| Pierce, Francis J.                    | 12   | 0.70         | 0.00         | 0.30         | Soil Management Systems                           |
| Renner, Karen A.                      | 12   | 0.50         | 0.50         | 0.00         | Weed Science                                      |
| Ritchie, Joe T. <sup>4</sup>          | 12   | 0.00         | 0.50         | 0.00         | Soil Physics/Plant Stress                         |
| Robertson, G. Philip                  | 12   | 0.38         | 0.00         | 0.62         | Ecosystem Ecology                                 |
| Rogers, John N. III.                  | 13   | 0.25         | 0.00         | 0.75         | Turfgrass Management                              |
| Rugh, Clayton L.                      | 14   | 0.25         | 0.00         | 0.75         | Phytoremediation, Molecular and Cellular Genetics |
| Smucker, A.J.M.                       | 12   | 0.75         | 0.00         | 0.25         | Soil Biophysics                                   |
| Teppen, Brian J.                      | 14   | 0.75         | 0.00         | 0.25         | Surface Soil Chemistry                            |
| Thelen, Kurt D.                       | 14   | 0.40         | 0.60         | 0.00         | Cropping Systems Agronomist                       |
| Thomashow, Michael F.                 | 12   | 0.76         | 0.00         | 0.24         | Plant and Microbial Molecular Genetics            |
| Tiedje, James M.                      | 12   | 0.60         | 0.00         | 0.40         | Soil Microbiology/Microbial Ecology               |
| Ward, Richard W.                      | 13   | 0.75         | 0.00         | 0.25         | Wheat Breeding                                    |
| Warncke, Darryl D.                    | 12   | 0.50         | 0.50         | 0.00         | Greenhouse/Vegetable Soil Fertility               |
| <b>TOTALS:</b>                        |      | <b>17.11</b> | <b>5.69</b>  | <b>10.70</b> |   |
| <i>Adjustment for GREEN Positions</i> |      | <i>-0.75</i> | <i>-0.25</i> | <i>0.00</i>  |   |
| <b>ADJUSTED TOTALS</b>                |      | <b>16.36</b> | <b>5.44</b>  | <b>10.70</b> |   |

## PROJECTS

|            |   |               |
|------------|---|---------------|
| MICL00319  | Classification, Genesis and Evaluation of Michigan Soils  | Mokma, D.     |
| MICL00569  | Breeding and Testing Small Grain Cultivars for Michigan   | Freed, R.     |
| MICL00908  | Fundamental Factors in Cultural and Chemical Weed Control, Weed Competition and Weed Life Cycles          | Renner, K.    |
| MICL01462* | Management of Eroded Soils for Enhancement of Productivity and Environmental Quality                      | Mokma, D.     |
| MICL01471* | Chemistry and Bioavailability of Waste Constituents in Soils  | Jacobs, L.    |
| MICL01568  | Plant Biotechnology: Molecular Approaches to Improve Environmental Stress Tolerance                       | Thomashow, M. |
| MICL01574  | Movement and Degradation of Organic Contaminants in Soils   | Boyd, S.      |
| MICL01617* | Biological and Ecological Basis for Weed Management Decision Support Systems to Reduce Herbicide Use      | Kells, J.     |
| MICL01654  | Genetic Improvement of Beans ( <i>Phaseolus vulgaris</i> L.) For Yield, Pest Resistance and Food Value    | Kelly, J.     |
| MICL01685  | Crop Rotation Effects on Soil Microbial Activity, Nutrient Use Efficiency and Productivity                | Harwood, R.   |
| MICL01761  | Weed Management as a Component of Field Crop Production Systems   | Kells, J.     |
| MICL01768  | Management and Production of Grasses, Legumes and Their Mixtures for Sustainable Forage Crops and Pasture | Leep, R.      |
| MICL01772* | Characterizing Nitrogen Mineralization and Availability in Crop Systems to Protect Water Resources        | Jacobs, L.    |
| MICL01779  | The Physiology and Biochemistry of Herbicide Action, Selectivity and Degradation                          | Penner, D.    |
| MICL01780  | Impact Absorption, Traction and Wear Tolerance Investigation on Turf and Soil Surfaces                    | Rogers, J.    |

# Crop and Soil Sciences (continued)

|           |   |                   |
|-----------|---|-------------------|
| MICL01782 | Application of Organic and Other Waste Residuals to Agricultural Soils as a Waste Management Option | Jacobs, L.        |
| MICL01796 | Soil and Site-Specific Management for Conservation in Agricultural Systems                          | Pierce, F.        |
| MICL01797 | Soil Microbiology and Biochemistry in Agroecosystems  | Paul, E.          |
| MICL01806 | Breeding and Genetics for the Improvement of Potato ( <i>Solanum tuberosum</i> L.)                  | Douches, D.       |
| MICL01807 | Properties of High Sand Content Soils for Turfgrass Uses  | Crum, J.          |
| MICL01821 | Microbial Ecology of Soil and Biodegradation  | Tiedje, J.        |
| MICL01830 | Wheat Breeding and Genetics   | Ward, R.          |
| MICL01837 | Cultivation and Topdressing Effects on Turf and Soil  | Rieke, P.         |
| MICL01855 | The Role of Mutation in Bacterial Evolution   | Lenski, R.        |
| MICL01858 | Systems of Cropping   | Christenson, D.   |
| MICL01866 | Simulation and Measurement of the Water, Nitrogen and Phosphorus Dynamics in Field Crop Production  | Ritchie, J.       |
| MICL01867 | Parsimonious Biometrical Models Applicable in Agriculture and Natural Resources                     | Schabenberger, O. |
| MICL01872 | Nitrogen Loss in Row Crop Agriculture   | Robertson, G.     |
| MICL01884 | Soil Biophysical Mechanisms of Soil Aggregation   | Smucker, A.       |
| MICL01909 | Turfgrass Physiology and Site-Specific Management   | Baird, J.         |
| MICL03122 | Development and Correlation of Soil Test Procedures With Crop Yields and Plant Nutrient Contents    | Warncke, D.       |
| MICL03260 | Forage Management Studies in Northern Michigan  | Leep, R.          |
| MICL03302 | Management of Organic Soils for Crop Production   | Warncke, D.       |
| MICL03324 | Drought Resistance in Common Bean   | Foster, E.        |
| MICL03359 | Variety Release: Canola and Wheat Management  | Copeland, L.      |
| MICL07620 | Sustainable Agriculture: Management Systems for Integrating Soil, Plants and Animals                | Harwood, R.       |
| MICL07640 | Sustainable Agriculture: Ecological Integration of Soil, Plants and Animals                         | Harwood, R.       |
| MICL08194 | Root and Soil Carbon Contributions to the Stability and Function of Soil Aggregates                 | Smucker, A.       |
| MICL08220 | Pesticide-Clay Mineral Interactions in Aqueous Systems  | Boyd, S.          |
| MICL08224 | Mechanism of CBF Gene Regulation by Low Temperature   | Thomashow, M.     |

## Entomology

Phone: 355-4665



Edward J. Grafius,  
Chair

### FACULTY

|                         | RANK | MAES | MSUE | JOINT | AREA OF INTEREST  |
|-------------------------|------|------|------|-------|---|
| Ayers, George S.        | 12   | 0.25 | 0.00 | 0.75  | IPM/Apiculture  |
| Bird, George W.         | 12   | 0.20 | 0.65 | 0.15  | Agricultural Nematology   |
| Bristow, Catherine      | 13   | 0.30 | 0.00 | 0.70  | Insect Ecology  |
| DiFonzo, Christina D.   | 14   | 0.10 | 0.25 | 0.65  | Field Crop Entomology/Pesticide Education Coordinator           |
| Dong, Ke                | 14   | 0.25 | 0.00 | 0.75  | Insect Toxicology   |
| Edens, Thomas C.        | 12   | 0.20 | 0.00 | 0.80  | Resource Economics and Policy                                   |
| Gage, Stuart H.         | 12   | 0.48 | 0.12 | 0.40  | Environmental Systems/Entomological Surveys                     |
| Gut, Larry              | 14   | 0.25 | 0.65 | 0.10  | Tree Fruit Insects  |
| Hollingworth, Robert M. | 12   | 0.15 | 0.10 | 0.75  | Pesticide Toxicology/Action Insecticide Resistance/IR 4 Program |
| Huang, Zhiyong          | 14   | 0.21 | 0.53 | 0.26  | Apiculture  |



|                                       | RANK | MAES         | MSUE         | JOINT        | AREA OF INTEREST                      |
|---------------------------------------|------|--------------|--------------|--------------|---------------------------------------|
| Isaacs, Rufus <sup>7</sup>            | 14   | 0.45         | 0.45         | 0.10         | Small Fruit Insect Management         |
| Landis, Douglas A.                    | 13   | 0.66         | 0.18         | 0.16         | Insect Ecology, Biological Control    |
| McCullough, Deborah G.                | 13   | 0.30         | 0.50         | 0.20         | Forest Entomology                     |
| Melakeberhan, Haddish                 | 14   | 0.20         | 0.00         | 0.80         | Plant-Nematode Interaction Physiology |
| Merritt, Richard W.                   | 12   | 0.50         | 0.00         | 0.50         | Aquatic Insect Ecology                |
| Miller, James R.                      | 12   | 0.42         | 0.00         | 0.58         | Insect Behavior                       |
| Olsen, Larry                          | 13   | 0.20         | 0.80         | 0.00         | Agrimedicine/PIAP Program             |
| Raikhel, Alexander S.                 | 12   | 0.30         | 0.00         | 0.70         | Insect Physiology                     |
| Scriber, J. Mark                      | 12   | 0.43         | 0.07         | 0.50         | Insect Ecology                        |
| Smitley, David R.                     | 13   | 0.25         | 0.60         | 0.15         | Landscape/Ornamental Insect Ecology   |
| Stehr, Frederick W.                   | 12   | 0.40         | 0.00         | 0.60         | Insect Biocontrol Systems             |
| Thiem, Suzanne                        | 13   | 0.40         | 0.00         | 0.60         | Insect Molecular Biology              |
| Walker, Edward D.                     | 13   | 0.33         | 0.33         | 0.34         | Medical/Veterinary Entomology         |
| Zabik, Matthew J.                     | 12   | 0.10         | 0.00         | 0.90         | Environmental Toxicology              |
| <b>TOTALS:</b>                        |      | <b>7.33</b>  | <b>5.23</b>  | <b>11.44</b> |                                       |
| <i>Adjustment for GREEN Positions</i> |      | <i>-0.45</i> | <i>-0.45</i> | <i>-0.10</i> |                                       |
| <b>ADJUSTED TOTALS</b>                |      | <b>6.88</b>  | <b>4.78</b>  | <b>11.34</b> |                                       |

## PROJECTS

|            |  |                  |
|------------|--|------------------|
| MICL01067* | Climate and Agricultural Landscape Productivity Analysis and Assessment in the North Central Region                    | Gage, S.         |
| MICL01563* | Spatial Dynamics of Leafhopper Pests and Their Management on Alfalfa   | DiFonzo, C.      |
| MICL01584* | Biologically Based IPM Systems for Management of Plant-Parasitic Nematodes   | Bird, G.         |
| MICL01606  | Biological Control and Integrated Management of Insects in Nurseries, Turf and the Urban Forest                        | Smitley, D.      |
| MICL01640* | Ecology and Management of European Corn Borer and Other Stalk-Boring Lepidoptera                                       | Landis, D.       |
| MICL01644  | Plant Chemical Defenses: Insect Detoxication and Ecological Factors Affecting Gene Flow and Host Selection/Hybrid Zone | Scriber, J.      |
| MICL01663  | Biology and Management of Insect Pests of Vegetable Crops  | Grafius, E.      |
| MICL01700  | Ecology and Management of Forest Insects in Michigan   | McCullough, D.   |
| MICL01733  | Mechanisms of Baculovirus Pathogenesis in Insects  | Thiem, S.        |
| MICL01734  | Diet Choice and Foraging in Ants   | Bristow, C.      |
| MICL01742  | Molecular Basis of Insect Reproduction   | Raikhel, A.      |
| MICL01745  | The Center for Arthropod Diversity Study   | Stehr, F.        |
| MICL01783  | Influence of Agricultural Landscape Structure on Biological Control of Pests by Insects                                | Landis, D.       |
| MICL01792  | Physiological Basis for Integrated Approach Towards Sustainable Management Of Plant Parasitic Nematodes                | Melakeberhan, H. |
| MICL01813* | Genetic Variability in the Cyst and Root-Knot Nematodes  | Melakeberhan, H. |
| MICL01814  | Factors Regulating Insect Host-Plant Colonization  | Miller, J.       |
| MICL01826  | Development of Bee Forage Systems  | Ayers, G.        |
| MICL01915  | Large Scale Assessment of Insect Populations From an Ecosystem Management Perspective                                  | Gage, S.         |
| MICL01936  | Molecular Characterization of Knock-Down Resistance in the German Cockroach  | Dong, K.         |
| MICL01942  | Shifts in Ant Communities in Response to Habitat and Management Regime   | Bristow, C.      |
| MICL03338  | Ecology and Management of Arthropod Vector Populations and Vector-Borne Diseases                                       | Walker, E.       |
| MICL03361  | Biology and Control of Biting Flies in Michigan  | Merritt, R.      |
| MICL03379  | New Arthropod Pest Controls and Management Strategies for Michigan Tree Fruit Production Systems                       | Gut, L.          |
| MICL07641  | Safeguarding the Supply of Speciality Crops for the Consumer   | Gut, L.          |

# Entomology (continued)

|           |   |             |
|-----------|---|-------------|
| MICL08189 | Managing Natural and Engineering Resistance in Potato to Colorado Potato Beetle                     | Grafius, E. |
| MICL08192 | Influence of Perennial Habitats Including High-Value Woody Species on Natural Enemies of Crop Pests | Landis, D.  |
| MICL08223 | Mode of Action of <i>Nosema apis</i> , a Microsporidian Pathogen of Honey Bees                      | Huang, Z.   |
| MICL08226 | Can Refuges Moderate Disturbance and Enhance Biological Control in Annual Crops?                    | Landis, D.  |

## Family and Child Ecology

Phone: 355-7680



Marjorie J. Kostelnik,  
Chair

### FACULTY

|                         | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST         |
|-------------------------|------|-------------|-------------|-------------|--------------------------|
| Imig, David R.          | 12   | 0.25        | 0.00        | 0.75        | Family Ecology           |
| Keefe, Dennis R.        | 14   | 0.50        | 0.00        | 0.50        | Family Economics         |
| Keith, Joanne G.        | 12   | 0.10        | 0.80        | 0.10        | Human Development/Family |
| Schiamberg, Lawrence R. | 12   | 0.28        | 0.00        | 0.72        | Human Development/Family |
| Walker, Rosemary A.     | 12   | 0.50        | 0.00        | 0.50        | Family Economics         |
| <b>TOTALS:</b>          |      | <b>1.63</b> | <b>0.80</b> | <b>2.57</b> |                          |

### PROJECTS

|            |  |                |
|------------|--|----------------|
| MICL01523* | Family Business: Interaction in Work and Family Spheres  | Walker, R.     |
| MICL01786  | Determinants of Small Family Business Outcomes   | Walker, R.     |
| MICL01841  | Identification and Evaluation of Internal and External Assets in the Lives of Children and Adolescents | Keith, J.      |
| MICL01897* | Rural Low-Income Families: Tracking Their Well-Being and Functioning in the Context of Welfare Reform  | Keefe, D.      |
| MICL01911  | Moving and Aging-In-Place in the Retirement Planning of the Maturing Population                        | Schiamberg, L. |
| MICL03349  | The Study of Family Social Capital in Rural Michigan Communities                                       | Imig, D.       |
| MICL03368  | Family-Environment Transactions: Effects on Economic Well-Being and Michigan Families' Life Quality    | Keefe, D.      |

## Fisheries and Wildlife

Phone: 355-4478



Thomas G. Coon,  
Acting Chair

### FACULTY

|                                | RANK | MAES | MSUE | JOINT | AREA OF INTEREST                      |
|--------------------------------|------|------|------|-------|---------------------------------------|
| Bence, James R. <sup>6</sup>   | 14   | 0.75 | 0.20 | 0.05  | Fish Population Dynamics/Fish Ecology |
| Bremigan, Mary T. <sup>6</sup> | 14   | 0.60 | 0.00 | 0.40  | Fish Management                       |
| Campa, Henry III               | 13   | 0.50 | 0.00 | 0.50  | Wildlife Habitat Ecology              |
| Coon, Thomas G.                | 13   | 0.20 | 0.00 | 0.80  | Fish Ecology/Stream Management        |
| Garling, Donald L.             | 12   | 0.30 | 0.50 | 0.20  | Aquaculture                           |
| Hayes, Daniel B. <sup>6</sup>  | 14   | 0.75 | 0.20 | 0.05  | Stream Fisheries Biology              |
| Jones, Michael L. <sup>6</sup> | 13   | 0.75 | 0.20 | 0.05  | Fisheries Stream Models               |
| Li, Weiming <sup>6</sup>       | 14   | 0.75 | 0.20 | 0.05  | Fish Physiology                       |
| Liu, Jianguo <sup>6</sup>      | 14   | 0.75 | 0.20 | 0.05  | Wildlife Systems Models               |
| Lupi Jr., Frank <sup>6</sup>   | 14   | 0.10 | 0.28 | 0.62  | Natural Resource Economics            |



|                                      | RANK | MAES         | MSUE         | JOINT        | AREA OF INTEREST    |
|--------------------------------------|------|--------------|--------------|--------------|---------------------|
| Maurer, Brian A. <sup>6</sup>        | 13   | 0.50         | 0.20         | 0.30         | Landscape Ecology   |
| Millenbah, Kelly F.                  | 13   | 0.50         | 0.00         | 0.50         | Restoration Ecology |
| Peyton, R. Benny                     | 12   | 0.42         | 0.00         | 0.58         | Human Dimensions    |
| Prince, Harold H.                    | 12   | 0.75         | 0.00         | 0.25         | Waterfowl/Wetlands  |
| Scribner, Kim T. <sup>6</sup>        | 14   | 0.75         | 0.20         | 0.05         | Molecular Ecology   |
| Soranno, Patricia A.                 | 14   | 0.50         | 0.00         | 0.50         | Limnology           |
| Winterstein, Scott R.                | 13   | 0.50         | 0.00         | 0.50         | Wildlife Biometry   |
| <b>TOTALS:</b>                       |      | <b>9.37</b>  | <b>2.18</b>  | <b>5.45</b>  |                     |
| <i>Adjustment for PERM Positions</i> |      | <i>-5.70</i> | <i>-1.68</i> | <i>-1.62</i> |                     |
| <b>ADJUSTED TOTALS</b>               |      | <b>3.67</b>  | <b>0.50</b>  | <b>3.83</b>  |                     |

## PROJECTS

|           |  |                 |
|-----------|--|-----------------|
| MICL01540 | Ecology, Population Dynamics and Management of Michigan Great Lakes Fisheries Resources              | Taylor, W.      |
| MICL01646 | Wildlife Responses to Habitat Management   | Campa, H.       |
| MICL01719 | Management of Forests and Wildlife for Multiple Use Benefits   | Campa, H.       |
| MICL01740 | Development of Commercial Fish Culture Techniques  | Garling, D.     |
| MICL01758 | Relationship Between Habitat Characteristics and Fish Population Dynamics                            | Hayes, D.       |
| MICL01759 | Tools and Information for Improved Management of Great Lakes' Fisheries                              | Bence, J.       |
| MICL01785 | Systems Modeling of Wildlife Dynamics Across Heterogeneous Landscapes                                | Liu, J.         |
| MICL01868 | The Influence of Landscapes and Biological Communities on Freshwater Ecosystems                      | Soranno, P.     |
| MICL01893 | Uncertainty and the Management of Great Lakes Fisheries  | Jones, M.       |
| MICL01894 | Intraspecific Chemical Communication of Fish   | Li, W.          |
| MICL01904 | Classification of Aquatic Ecosystems for Management Across Ecological Gradients                      | Bremigan, M.    |
| MICL01923 | Habitat and Its Effects on the Ecology and Management of Fishes                                      | Coon, T.        |
| MICL03378 | Wildlife Response to Ecological Restoration  | Millenbah, K.   |
| MICL03380 | Modeling Wildlife Population Dynamics  | Winterstein, S. |
| MICL03382 | Composition of Waterfowl Harvest and Avian Use of Wetland Habitats in Michigan                       | Prince, H.      |
| MICL03383 | Genetic Diversity of Native and Introduced Fisheries in the Great Lakes                              | Scribner, K.    |
| MICL03386 | Human Dimensions of Managing Natural Resource Issues: Cultural Carrying Capacity of Deer in Michigan | Peyton, R.      |
| MICL06891 | Predictive Genealogical Model for Transmission of Tuberculosis in Free-Ranging Michigan Deer         | Scribner, K.    |
| MICL09006 | Support for a National Coordinator for Aquaculture New Animal Drug Applications                      | Batterson, T.   |
| MICL10007 | Regional Aquaculture Center  | Batterson, T.   |
| MICL10008 | Regional Aquaculture Center  | Batterson, T.   |
| MICL10009 | Regional Aquaculture Center  | Batterson, T.   |
| MICL10010 | Regional Aquaculture Center  | Batterson, T.   |
| MICL10011 | Regional Aquaculture Center  | Batterson, T.   |

# Food Science and Human Nutrition

Phone: 355-8474



Mark A. Uebersax,  
Chair

## FACULTY

|                      | RANK | MAES        | MSUE        | JOINT        | AREA OF INTEREST                          |
|----------------------|------|-------------|-------------|--------------|---|
| Bennink, Maurice R.  | 12   | 0.50        | 0.00        | 0.50         | Nutritional Biochemistry                  |
| Bond, Jenny T.       | 12   | 0.20        | 0.00        | 0.80         | Prenatal/Postnatal Nutrition              |
| Booren, Alden M.     | 12   | 0.15        | 0.75        | 0.10         | Meat/Poultry/Fish                         |
| Bourquin, Leslie D.  | 14   | 0.25        | 0.75        | 0.00         | Food Safety                               |
| Cash, Jerry N.       | 12   | 0.25        | 0.75        | 0.00         | Fruit/Vegetable Products                  |
| Chenoweth, Wanda L.  | 12   | 0.25        | 0.00        | 0.75         | Clinical Nutrition                        |
| Doumit, Matthew E.   | 14   | 0.25        | 0.00        | 0.75         | Meat Quality                              |
| Fraker, Pamela J.    | 12   | 0.20        | 0.00        | 0.80         | Cellular Immunology                       |
| Hoerr, Sharon M.     | 12   | 0.40        | 0.00        | 0.60         | Community Nutrition                       |
| Hord, Norman         | 14   | 0.25        | 0.00        | 0.75         | Nutritional Epidemiology                  |
| Linz, John E.        | 12   | 0.50        | 0.00        | 0.50         | Food Microbiology                         |
| Ng, Perry K. W.      | 13   | 0.50        | 0.00        | 0.50         | Cereal Science                            |
| Ofoli, Robert Y.     | 13   | 0.49        | 0.00        | 0.51         | Colloid/Interface Science                 |
| Osburn, Wesley N.    | 14   | 0.15        | 0.00        | 0.85         | Meat/Poultry Production                   |
| Pestka, James J.     | 12   | 0.62        | 0.00        | 0.38         | Food Microbiology                         |
| Romsos, Dale R.      | 12   | 0.50        | 0.00        | 0.50         | Lipid Metabolism                          |
| Ryser, Elliott T.    | 14   | 0.53        | 0.00        | 0.47         | Dairy Foods                               |
| Schroeder, Joseph J. | 14   | 0.50        | 0.00        | 0.50         | Nutritional Biochemistry/Bioactive Lipids |
| Smith, Denise M.     | 12   | 0.67        | 0.00        | 0.33         | Poultry/Egg Products                      |
| Song, Won O.         | 12   | 0.23        | 0.00        | 0.77         | Nutritional Assessment                    |
| Steffe, James F.     | 12   | 0.25        | 0.00        | 0.75         | Food Engineering/Rheology                 |
| Strasburg, Gale M.   | 13   | 0.65        | 0.00        | 0.35         | Muscle Biochemistry                       |
| Ustunol, Zeynep      | 13   | 0.72        | 0.00        | 0.28         | Dairy Foods                               |
| Zabik, Mary E.       | 12   | 0.19        | 0.00        | 0.81         | Foods                                     |
| Zile, Maija H.       | 12   | 0.50        | 0.00        | 0.50         | Nutrition                                 |
| <b>TOTALS:</b>       |      | <b>9.70</b> | <b>2.25</b> | <b>13.05</b> |   |

## PROJECTS

|            |   |               |
|------------|---|---------------|
| MICL01323  | Improving Process Efficiency, Product Quality, and Nutrient Composition of Fruit and Vegetable Products | Uebersax, M.  |
| MICL01413  | Metabolism and Function of Vitamin A  | Zile, M.      |
| MICL01444* | Role of N-3/N-6 Polyunsaturated Fatty Acids in Health Maintenance                                       | Romsos, D.    |
| MICL01448  | Microbial Food-Borne Disease  | Pestka, J.    |
| MICL01478* | Genetic Improvement of Beans ( <i>Phaseolus vulgaris</i> L.) For Yield, Pest Resistance and Food Value  | Uebersax, M.  |
| MICL01599  | Regulation of Calcium in Muscle Sarcoplasm  | Strasburg, G. |
| MICL01623  | Comparative Aspects of Nutrition and Lipid Metabolism   | Romsos, D.    |
| MICL01632  | Improving the Quality and Safety of Value-Added Meat and Poultry Products                               | Smith, D.     |
| MICL01664  | Development, Quality and Safety of Value-Added Dairy and Dairy-Based Products                           | Ustunol, Z.   |
| MICL01665  | Nutritional Assessment in Population-Based Epidemiological Studies                                      | Song, W.      |
| MICL01694* | Nutrient Bioavailability: A Key to Human Nutrition  | Chenoweth, W. |
| MICL01699  | Molecular Structure of Soft Wheat Proteins in Relation to End-Use Quality                               | Ng, P.        |
| MICL01706  | Interactions of Biological Macromolecules at the Liquid-Liquid Interface                                | Ofoli, R.     |
| MICL01715* | Improve Food Safety Through Discovery and Control of Natural and Induced Toxicants and Antitoxinants    | Pestka, J.    |



|            |   |               |
|------------|---|---------------|
| MICL01762  | Relationship of Diet and Cancer   | Bennink, M.   |
| MICL01764  | Quality and Safety of Processed Foods   | Gray, J.      |
| MICL01791  | Processing and Quality Evaluation of Fruits and Vegetables  | Cash, J.      |
| MICL01795  | Modulation of Colon and Breast Cancer Cell Growth by Sphingolipids  | Schroeder, J. |
| MICL01804* | Using Stages of Change Model to Promote Consumption of Grains, Vegetables and Fruits by Young Adults          | Hoerr, S.     |
| MICL01856  | Aflatoxin B1 Biosynthesis in <i>Aspergillus</i>   | Linz, J.      |
| MICL01878  | Reducing Dietary Risk for Chronic Disease via a Behavioral Approach in High Risk Populations                  | Hoerr, S.     |
| MICL01887* | Enhancing Food Safety Through Control of Food-Borne Disease Agents  | Linz, J.      |
| MICL01895  | Influence of Diet and Phytochemicals on Colon Carcinogenesis  | Bourquin, L.  |
| MICL01902  | Interactions of Minerals With Other Dietary Components: Effect on Bioavailability                             | Chenoweth, W. |
| MICL01920* | Marketing and Delivery of Quality Cereals and Oilseeds  | Ng, P.        |
| MICL01932  | Microbial Safety of Foods   | Ryser, E.     |
| MICL01937  | Processing Treatments Influencing Functional Properties and Utilization of Muscle Foods                       | Booren, A.    |
| MICL03363  | Food Industry Institute   | Hegarty, P.   |
| MICL03370  | Food Safety Issues for Michigan Consumers   | Zabik, M.     |
| MICL03371  | Targeting Michigan Groups at Nutritional Health/Risk: Identifying Needs, Intervention Strategies and Outcomes | Bond, J.      |
| MICL06885  | Apoptosis and Sphingolipids in Fumonisin-Induced Kidney Cell Death  | Schroeder, J. |
| MICL08191  | Metabolism and Function of Retinoic Acid in Quail Embryogenesis   | Zile, M.      |
| MICL08195  | Biochemical Characterization of Pale, Soft, Exudative Turkey  | Strasburg, G. |
| MICL08196  | Recombinant Antibodies for Natural Toxicants  | Pestka, J.    |

## Forestry

Phone: 355-0091



Daniel E. Keathley,  
Chair

### FACULTY

|                                      | RANK | MAES         | MSUE         | JOINT        | AREA OF INTEREST          |
|--------------------------------------|------|--------------|--------------|--------------|---------------------------|
| Dickmann, Donald I.                  | 12   | 0.70         | 0.00         | 0.30         | Fire Ecology/Silviculture |
| Epperson, Bryan K.                   | 13   | 0.70         | 0.00         | 0.30         | Forest Genetics           |
| Fried, Jeremy S.                     | 13   | 0.60         | 0.00         | 0.40         | Forest Management         |
| Hart, James B., Jr.                  | 13   | 0.50         | 0.00         | 0.50         | Forest Soils              |
| Kamdem, Donatien-Pascal              | 13   | 0.70         | 0.00         | 0.30         | Wood Science              |
| Kielbaso, Julian J.                  | 12   | 0.15         | 0.25         | 0.60         | Urban Forestry            |
| Kobe, Richard K.                     | 14   | 0.70         | 0.00         | 0.30         | Forest Ecology            |
| Leefers, Larry A.                    | 13   | 0.50         | 0.00         | 0.50         | Forest Economics          |
| McDonough, Maureen H.                | 12   | 0.15         | 0.50         | 0.35         | Forest Sociology          |
| Potter-Witter, Karen L.              | 13   | 0.20         | 0.65         | 0.15         | Forest Economics          |
| Ramm, Carl W.                        | 13   | 0.60         | 0.00         | 0.40         | Forest Biometrics         |
| Walters, Michael B <sup>6</sup>      | 14   | 0.75         | 0.20         | 0.05         | Forest Ecology            |
| <b>TOTALS:</b>                       |      | <b>6.25</b>  | <b>1.60</b>  | <b>4.15</b>  |                           |
| <i>Adjustment for PERM Positions</i> |      | <i>-0.75</i> | <i>-0.20</i> | <i>-0.05</i> |                           |
| <b>ADJUSTED TOTALS</b>               |      | <b>5.50</b>  | <b>1.40</b>  | <b>4.10</b>  |                           |

## Forestry (continued)

|            |  |               |
|------------|--|---------------|
| MICL01693* | The National Atmospheric Deposition Program (NADP)   | Kobe, R.      |
| MICL01773  | Testing Lake States TWIGS: Five- and Ten-Year Growth Projections for Upland Hardwoods        | Ramm, C.      |
| MICL01774  | Managing the Genetic Diversity of Michigan Pines   | Epperson, B.  |
| MICL01805  | Bioremediation of Condensate Produced During Conditioning of Veneer Logs                     | Kamdern, D.   |
| MICL01811  | Incorporating Risk, Natural Resources Accounting and Hedonic Valuation in Forestry Decisions | Leefers, L.   |
| MICL01812  | Municipal Tree Management  | Kielbaso, J.  |
| MICL01845  | Long-Term Diameter, Basal Area and Ordered Categorical Responses of Oak and Hardwood Forests | Hart, J.      |
| MICL01869  | Forest Management for the Regeneration of Hardwoods and Conifers                             | Lantagne, D.  |
| MICL01871  | Modeling Landscape-Level Variation in Forest Community Dynamics                              | Kobe, R.      |
| MICL01899  | Justice in Public Participation and Natural Resource Decision Making                         | McDonough, M. |
| MICL07615  | Advanced Technology Applications to Eastern Hardwood Utilization                             | Kamdern, D.   |
| MICL07623  | Advanced Technology Applications to Eastern Hardwood Utilization                             | Kamdern, D.   |
| MICL07631  | Advanced Technology Applications to Eastern Hardwood Utilization                             | Kamdern, D.   |

## Geography

Phone: 355-4649

### PROJECTS

|           |  |              |
|-----------|--|--------------|
| MICL03373 | Impacts of Weather and Climate on Michigan Agriculture | Andresen, J. |
|-----------|--|--------------|

## Horticulture

Phone: 355-5191



Wayne H. Loescher,  
Chair

### FACULTY

|                      | RANK | MAES | MSUE | JOINT | AREA OF INTEREST                        |
|----------------------|------|------|------|-------|---|
| Beaudry, Randolph M. | 13   | 0.50 | 0.50 | 0.00  | Postharvest Fruit Physiology            |
| Behe, Bridget K.     | 13   | 0.25 | 0.00 | 0.75  | Horticulture Marketing                  |
| Biernbaum, John A.   | 12   | 0.20 | 0.00 | 0.80  | Plant Physiology/Floriculture           |
| Cameron, Arthur C.   | 12   | 0.70 | 0.00 | 0.30  | Plant Physiology/Landscape Horticulture |
| Carlson, William H.  | 12   | 0.35 | 0.50 | 0.15  | Floriculture/Physiology and Bedding     |
| Cregg, Bert M.       | 14   | 0.50 | 0.50 | 0.00  | Plant Physiology/Woody Ornamentals      |
| Dilley, David R.     | 12   | 0.80 | 0.00 | 0.20  | Postharvest Physiology/Pomology         |



|                                       | RANK | MAES         | MSUE        | JOINT        | AREA OF INTEREST                         |
|---------------------------------------|------|--------------|-------------|--------------|--|
| Edson, Charles E. <sup>7</sup>        | 13   | 0.25         | 0.00        | 0.75         | Integrated Crop Management               |
| Flore, James A.                       | 12   | 0.65         | 0.00        | 0.35         | Plant Physiology/Pomology                |
| Grumet, Rebecca                       | 12   | 0.90         | 0.00        | 0.10         | Vegetable Breeding/Genetics              |
| Hancock, James F.                     | 12   | 0.90         | 0.00        | 0.10         | Small Fruit Breeding/Genetics            |
| Hanson, Eric J.                       | 12   | 0.35         | 0.65        | 0.00         | Pomology Small Fruits                    |
| Heins, Royal D.                       | 12   | 0.75         | 0.00        | 0.25         | Plant Physiology/Floriculture            |
| Herner, Robert C.                     | 12   | 0.35         | 0.00        | 0.65         | Postharvest Physiology/Vegetable Crop    |
| Howell, Gordon S.                     | 12   | 0.80         | 0.00        | 0.20         | Plant Physiology/Viticulture/Enology     |
| Iezzoni, Amy F.                       | 12   | 0.80         | 0.00        | 0.20         | Fruit Breeding/Genetics                  |
| Lownds, Norman K.                     | 14   | 0.25         | 0.00        | 0.75         | Landscape Horticulture/Stress Physiology |
| Nair, Muraleedharan G.                | 12   | 0.90         | 0.00        | 0.10         | Natural Products/Chemistry               |
| Perry, Ronald L.                      | 12   | 0.50         | 0.50        | 0.00         | Pomology/Rootstocks                      |
| Rowe, D. Bradley                      | 14   | 0.25         | 0.00        | 0.75         | Landscape Horticulture                   |
| Schutzki, Robert E.                   | 13   | 0.10         | 0.00        | 0.90         | Landscape Horticulture                   |
| Sink, Kenneth C.                      | 12   | 0.75         | 0.00        | 0.25         | Genetics/Plant Breeding                  |
| van Nocker, Steven R.                 | 14   | 0.75         | 0.00        | 0.25         | Reproductive Development/Genetics        |
| Widders, Irvin E.                     | 12   | 0.67         | 0.00        | 0.33         | Vegetable Physiology                     |
| Zabadal, Thomas J.                    | 13   | 0.50         | 0.50        | 0.00         | Viticulture                              |
| Zandstra, Bernard H.                  | 12   | 0.25         | 0.75        | 0.00         | Vegetable Crops                          |
| <b>TOTALS:</b>                        |      | <b>13.97</b> | <b>3.90</b> | <b>8.13</b>  |  |
| <i>Adjustment for GREEN Positions</i> |      | <i>-0.25</i> | <i>0.00</i> | <i>-0.75</i> |  |
| <b>ADJUSTED TOTALS</b>                |      | <b>13.72</b> | <b>3.90</b> | <b>7.38</b>  |  |

## PROJECTS

|            |  |              |
|------------|--|--------------|
| MICL01155* | Postharvest Physiology of Fruits   | Dilley, D.   |
| MICL01222* | Plant Germ Plasm and Information Management and Utilization  | Iezzoni, A.  |
| MICL01272  | Physiology of Carbon Balance in Fruit Crops: Abiotic and Biotic Thresholds   | Flore, J.    |
| MICL01305* | Rootstock and Interstem Effects on Pome and Stone Fruit Trees  | Perry, R.    |
| MICL01325  | Weed Control in Vegetable Crop Management Systems  | Zandstra, B. |
| MICL01428  | Sour Cherry and Peach Breeding and Genetics  | Iezzoni, A.  |
| MICL01468  | Role of Ion Flux and Compartmentation in the Transduction of Environmentally Elicited Signals                                  | Widders, I.  |
| MICL01607  | Physiological Adaptation and Cultural Manipulation of Plant Systems  | Schutzki, R. |
| MICL01680  | Biologically Active Natural Products and Value-Added Products From Plants and Microbes for Agricultural and Pharmaceutical Use | Nair, M.     |
| MICL01684  | Modified Atmosphere Packaging of Horticultural Produce   | Cameron, A.  |
| MICL01697* | Decision Support for Design and Control of Plant Growth Systems  | Heins, R.    |
| MICL01731  | Genetic and Biotechnology Studies for Selected Horticultural Crops   | Sink, K.     |
| MICL01778  | Environmental and Physiological Variables Effect on Growth, Quality, and Marketability of Garden Crop                          | Carlson, W.  |
| MICL01810  | Genetic Improvement of Strawberries and Blueberries  | Hancock, J.  |
| MICL01824  | Physiological and Environmental Factors Influencing Growth and Development of Flower Crops                                     | Heins, R.    |
| MICL01839  | Efficient Use of Fertilizers in Fruit Production   | Hanson, E.   |
| MICL01846  | Tomato Ripening Mutants  | Herner, R.   |
| MICL01848  | Enhancement of Control Over Quality Loss in Horticultural Commodities Following Harvest  | Beaudry, R.  |
| MICL01901  | Marketability and Performance of Selected Horticultural Products and Services  | Behe, B.     |
| MICL01908  | Utilization of Chlorophyll Fluorescence in Propagation by Stem Cuttings  | Rowe, D.     |
| MICL01927* | Freeze Damage and Protection of Horticultural Species  | Howell, G.   |

## Horticulture (continued)

|           |  |                |
|-----------|--|----------------|
| MICL01933 | Greenhouse Organic Crop Production for Small Farms   | Biernbaum, J.  |
| MICL01941 | Repellents for Animals Derived From Plant Species  | Ries, S.       |
| MICL03218 | Vine Culture and Physiology for Best Yield, Fruit Quality and Adaptation to Environmental Stresses | Howell, G.     |
| MICL03305 | Viticultural Practices for Mechanical Pruning and Crop Control of Concord and Niagara Grapevines   | Zabadal, T.    |
| MICL03375 | Plant Science Education Outreach Through the MSU Horticultural Gardens                             | Lownds, N.     |
| MICL03388 | Molecular Biology of Plant Development Relating to the Needs of Michigan Horticulture              | van Nocker, S. |
| MICL07622 | Safeguarding the Supply of Specialty Crops for Consumers   | Flore, J.      |
| MICL07632 | Safeguarding the Supply of Specialty Crops for Consumers   | Hanson, E.     |
| MICL08202 | Relationship Between Genetic and Hormonal Control of Sex Expression in <i>Cucumis</i> Species      | Grumet, R.     |
| MICL09010 | Epigenetic Mechanisms and Changes in Gene Expression Associated with Flowering                     | van Nocker, S. |

## Human Environment and Design

Phone: 355-7712



Dana G. Stewart, Chair

### FACULTY

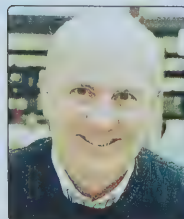
|                       | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST            |
|-----------------------|------|-------------|-------------|-------------|-----------------------------|
| Pysarchik, Dawn I.    | 13   | 0.31        | 0.00        | 0.69        | Merchandising Management    |
| Slocum, Ann C.        | 13   | 0.25        | 0.00        | 0.75        | Apparel Design and Textiles |
| Sontag, M. Suzanne    | 12   | 0.25        | 0.00        | 0.75        | Apparel Design and Textiles |
| Sternquist, Brenda J. | 12   | 0.25        | 0.00        | 0.75        | Merchandising Management    |
| <b>TOTALS:</b>        |      | <b>1.06</b> | <b>0.00</b> | <b>2.94</b> |                             |

### PROJECTS

|            |  |                |
|------------|--|----------------|
| MICL01442* | Occupational Safety and Health Through the Use of Protective Clothing                                | Slocum, A.     |
| MICL01775  | Processed Foods in India: Consumer Demand and Distribution Systems                                   | Pysarchik, D.  |
| MICL01833  | Emerging Free Markets: The Role of Federal vs. Municipal Approved Retail Joint Ventures              | Sternquist, B. |
| MICL03357  | Needs of the Michigan Textile/Apparel Industry: Characterization, Assessment and Response Strategies | Sontag, M.     |
| MICL08209  | The Food Retailing Industry in People's Republic of China: A Comparison of Behavioral Relationships  | Sternquist, B. |

## Integrated Plant Systems (Center for)

Phone: 353-9430



Mark E. Whalon, Acting Director

### FACULTY

|                       | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST                                      |
|-----------------------|------|-------------|-------------|-------------|---|
| DiFonzo, Christina D. | 14   | 0.10        | 0.40        | 0.50        | Field Crop Entomology/Pesticide Education Coordinator |
| <b>TOTALS:</b>        |      | <b>0.10</b> | <b>0.40</b> | <b>0.50</b> |   |

|           |  |             |
|-----------|--|-------------|
| MICL03365 | Biology and Management of Insects in Michigan Field Crops                            | DiFonzo, C. |
| MICL07616 | An Integrated Crop Management System to Reduce Pesticide Use in Asparagus Production | Edson, C.   |
| MICL07634 | Michigan Commodity and Pest Management Profiles                                      | Whalon, M.  |



Phone: 432-1317

PROJECTS  
MICL08210 Latinos in the Rural Midwest: Community Development Implications Chapa, J.

## Kellogg Biological Station

Phone: 616-671-5117



Michael J. Klug, Director

### FACULTY

|                | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST |
|----------------|------|-------------|-------------|-------------|------------------|
| Bush, Guy L.   | 12   | 0.10        | 0.00        | 0.90        | Genetics         |
| <b>TOTALS:</b> |      | <b>0.10</b> | <b>0.00</b> | <b>0.90</b> |                  |

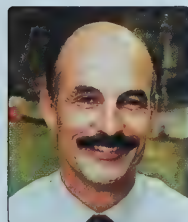
PROJECTS  
MICL08188 Closing Global Nitrous Oxide Cycle: Mechanistic Understanding Flux Partitioning  
Agricultural Landscapes

Robertson, G.



## Large Animal Clinical Sciences

Phone: 355-9593



Frederik J. Derksen,  
Chair

### FACULTY

|                         | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST                        |
|-------------------------|------|-------------|-------------|-------------|---|
| Baker, John C.          | 12   | 0.20        | 0.00        | 0.80        | Bovine Respiratory Diseases             |
| Erskine, Ronald J.      | 13   | 0.25        | 0.33        | 0.42        | Dairy Cattle Mastitis                   |
| Gomez-Duran, Charles O. | 14   | 0.50        | 0.30        | 0.20        | Swine Veterinary Medicine               |
| Grooms, Daniel L.       | 14   | 0.50        | 0.50        | 0.00        | Beef Disease Management                 |
| Herd, Thomas H.         | 12   | 0.25        | 0.00        | 0.75        | Cattle Nutrition and Metabolic Diseases |
| Holland, Robert E.      | 12   | 0.34        | 0.00        | 0.66        | Bovine Enteric Disease                  |
| Kaneene, John B.        | 12   | 0.14        | 0.00        | 0.86        | Epidemiology/Disease Impact             |
| Robinson, Norman E.     | 12   | 0.25        | 0.00        | 0.75        | Respiratory Physiology                  |
| Rook, Joseph S.         | 12   | 0.40        | 0.40        | 0.20        | Small Ruminant Animals                  |
| Sears, Phillip M.       | 12   | 0.35        | 0.35        | 0.30        | Dairy Disease Management                |
| Straw, Barbara E.       | 12   | 0.28        | 0.50        | 0.22        | Swine Veterinary Medicine               |
| <b>TOTALS:</b>          |      | <b>3.46</b> | <b>2.38</b> | <b>5.16</b> |   |

# Large Animal Clinical Sciences (continued)

## PROJECTS

|            |   |              |
|------------|---|--------------|
| MICL01417* | Bovine Respiratory Disease: Risk Factors, Pathogens, Diagnosis and Management                       | Baker, J.    |
| MICL01688* | Mastitis Resistance to Enhance Dairy Food Safety  | Erskine, R.  |
| MICL01708  | Reducing Economic Losses and Food Safety Risks Related to Mastitis                                  | Erskine, R.  |
| MICL01801  | Total Quality Management for Disease Control on Swine Farms   | Straw, B.    |
| MICL01819  | Nutritional Assessment of Animals and Animal Populations by Laboratory Means                        | Herd, T.     |
| MICL01820  | Assessment and Control of Enteric Pathogens Among Neonatal Calves                                   | Holland, R.  |
| MICL01898* | A National Agricultural Program to Approve Animal Drugs for Minor Species and Uses                  | Holland, R.  |
| MICL01916  | Diagnosis and Prevention of Bovine Viral Diarrhea Virus (BVDV)                                      | Grooms, D.   |
| MICL01917  | Bovine Respiratory Disease: Risk Factors, Immunology, Pathogenesis and Control                      | Baker, J.    |
| MICL01934  | Control of Swine Respiratory Disease: Alternatives to the Use of Prophylactic Antibiotics           | Duran, C.    |
| MICL03354  | Implementing Food Safety Through Total Quality Management On Michigan Dairy Farms                   | Sears, P.    |
| MICL03355  | Perinatal Lamb Mortality and Production Issues Associated with Pasture Lambing Systems in Michigan  | Rook, J.     |
| MICL06886  | Mucus Secretion in Horse Airways  | Robinson, N. |
| MICL06887  | Characterization of a Novel Equine Cartilage Matrix Metalloprotease                                 | Caron, J.    |
| MICL06893  | Purification of Bovine Anti-Coliform Antibodies for Passive Immunization Against Coliform Mastitis  | Erskine, R.  |
| MICL06894  | Development of a Live Attenuated Vaccine Against <i>Haemophilus parasuis</i>                        | Duran, C.    |
| MICL06895  | Epidemiology and Mechanisms of Resistance to Fluoroquinolones in Selected Bovine Bacterial Isolates | Kaneene, J.  |
| MICL07610  | Minor Use Animal Drug Program: North Central Region   | Holland, R.  |
| MICL07630  | Minor Use Animal Drug Program: North Central Region   | Holland, R.  |
| MICL07637  | Minor Use Animal Drug Program: North Central Region   | Holland, R.  |
| MICL08227  | Mucus Secretion and Clearability in Equine COPD   | Robinson, N. |

## Michigan Agricultural Experiment Station

Phone: 355-0123

## PROJECTS

|           |  |               |
|-----------|--|---------------|
| MICL03369 | Families, Children and Their Communities: Promoting Behavioral and Social Science Approaches | Bokemeier, J. |
|-----------|--|---------------|

## Microbiology

Phone: 355-6463



Jerry B. Dodgson, Chair

## FACULTY

|                      | RANK | MAES | MSUE | JOINT | AREA OF INTEREST     |
|----------------------|------|------|------|-------|----------------------|
| Bagdasarian, Michael | 12   | 0.39 | 0.00 | 0.61  | Molecular Biology    |
| Breznak, John A.     | 12   | 0.30 | 0.00 | 0.70  | Microbial Ecology    |
| Champness, Wendy C.  | 13   | 0.50 | 0.00 | 0.50  | Microbial Genetics   |
| Dazzo, Frank B.      | 12   | 0.80 | 0.00 | 0.20  | Microbial Ecology    |
| de Bruijn, Frans J.  | 12   | 0.38 | 0.00 | 0.62  | Molecular Biology    |
| Hausinger, Robert P. | 12   | 0.40 | 0.00 | 0.60  | Microbial Physiology |
| Klug, Michael J.     | 12   | 0.25 | 0.00 | 0.75  | Microbial Ecology    |
| Maes, Roger K.       | 12   | 0.03 | 0.00 | 0.97  | Virology             |



|                       | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST                       |
|-----------------------|------|-------------|-------------|-------------|--|
| Reddy, C. Adinarayana | 12   | 0.46        | 0.00        | 0.54        | Microbial Physiology/Ecology           |
| Schmidt, Thomas M.    | 14   | 0.40        | 0.00        | 0.60        | Microbial Ecology                      |
| Thomashow, Michael F. | 12   | 0.14        | 0.00        | 0.86        | Plant and Microbial Molecular Genetics |
| Tiedje, James M.      | 12   | 0.15        | 0.00        | 0.85        | Soil Microbiology                      |
| Velicer, Leland F.    | 12   | 0.30        | 0.00        | 0.70        | Virology                               |
| <b>TOTALS:</b>        |      | <b>4.50</b> | <b>0.00</b> | <b>8.50</b> |  |

## PROJECTS

|            |   |
|------------|---|
| MICL01154* | Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety                           |
| MICL01314  | The Beneficial <i>Rhizobium</i> -Rice Association   |
| MICL01557  | Molecular Genetic Regulation of Streptomyces Antibiotics  |
| MICL01593* | Advanced Technologies for the Genetic Improvement of Poultry  |
| MICL01628  | Analysis of the Genes of Marek's Disease Herpesvirus and the Proteins They Encode                   |
| MICL01629  | Lignin Degradation by Basidiomycete Fungi and Applications  |
| MICL01681  | Molecular Basis of Symbiotic Plant-Microbe Interactions   |
| MICL01728* | National Animal Genome Research Project   |
| MICL01757  | Understanding the Distribution of Microbial Populations in Soils                                    |
| MICL01834  | Molecular Mechanisms Involved in the Secretion of Pathogenicity Factors Through Bacterial Membranes |
| MICL01857  | Physiology and Phylogenetic Diversity of Termite Gut Symbionts                                      |
| MICL01918  | Enzymology of Alpha-Ketoglutarate-Dependent Dioxygenases  |
| MICL06890  | Recombinant Vaccines for Enhanced Antiviral (Cellular) Immunity                                     |
| MICL08199  | Chicken Genome Mapping Using AFLP and Anchor STS Markers  |
| MICL08213  | Structural and Mechanistic Analyses of Urease and Allantoinase                                      |
| MICL08217  | Development of Heat-Labile Enterotoxin (LT) as Carrier of Foreign Antigen Epitopes                  |
| MICL08218  | <i>In vivo</i> Expressed Genes of <i>Actinobacillus pleuropneumoniae</i>                            |
| MICL08222  | Role of Protein Phosphatase 2C in Lotus japonicus Root Nodule Development                           |

Maes, R.  
Dazzo, F.  
Champness, W.  
Dodgson, J.  
Velicer, L.  
Reddy, C.  
de Bruijn, F.  
Dodgson, J.  
Schmidt, T.

Bagdasarian, M.  
Breznak, J.  
Hausinger, R.  
Bagdasarian, M.  
Dodgson, J.  
Hausinger, R.  
Bagdasarian, M.  
Mulks, M.  
de Bruijn, F.

## MSU Extension

Phone: 355-2308

## PROJECTS

|           |  |             |
|-----------|--|-------------|
| MICL07628 | Management of the North Central Regional Pesticide Impact Assessment Program (NCPIAP) for FY98 | Olsen, L.   |
| MICL07633 | Management of the North Central Region Pesticide Impact Assessment Program (NCPIAP) for FY99   | Olsen, L.   |
| MICL07638 | Michigan's CSREES NAPIAP Program — 1999  | Olsen, L.   |
| MICL09007 | Overseas Technical Cooperation Impact Study: Evaluation of Impact of Overseas Assignments      | Andrews, M. |

# National Food Safety and Toxicology Center

Phone: 432-3100



Edward C. Mather, Acting Director

## FACULTY

|                         | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST               |
|-------------------------|------|-------------|-------------|-------------|--------------------------------|
| Giesy, John P.          | 12   | 0.25        | 0.00        | 0.75        | Aquatic Toxicology             |
| Zabik, Matthew J.       | 12   | 0.84        | 0.00        | 0.16        | Chemical Fate/Residue Analysis |
| Zacharewski, Timothy R. | 14   | 0.20        | 0.00        | 0.80        | Biochemical Toxicology         |
| <b>TOTALS:</b>          |      | <b>1.29</b> | <b>0.00</b> | <b>1.71</b> |                                |

## PROJECTS

|            |  |                  |
|------------|--|------------------|
| MICL01730* | A National Agricultural Program to Clear Pest Control Agents for Minor Uses                    | Hollingworth, R. |
| MICL01849  | Environmental Dynamics of Xenobiotics in the Environment and Analytical Methods Development    | Zabik, M.        |
| MICL01906  | Identification and Assessment of Endocrine Disruptors  | Zacharewski, T.  |
| MICL01919  | Fates and Effects of Potential Endocrine Modulating Compounds in the Environment               | Giesy, J.        |
| MICL03364  | Improved Microbial Food Safety Through Risk Assessment, Management, Communication and Analysis | Mather, E.       |
| MICL03367  | Microbial and Chemical Safety of the U.S. Food Supply  | Hollingworth, R. |
| MICL07613  | NC Region IR-4 Leader Lab Program to Clear Pest Control Agents for Minor Uses                  | Hollingworth, R. |
| MICL07629  | Minor Use Animal Drug Program: Headquarters  | Hollingworth, R. |
| MICL07635  | NC Region IR-4 Leader Lab Program to Clear Pest Control Agents for Minor Uses                  | Hollingworth, R. |

## Packaging

Phone: 355-9580



Bruce R. Harte, Director

## FACULTY

|                     | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST   |
|---------------------|------|-------------|-------------|-------------|--|
| Clarke, Robert      | 14   | 0.50        | 0.00        | 0.50        | Manufacturing Operations   |
| Downes, Theron W.   | 12   | 0.20        | 0.00        | 0.80        | Packaged Food Quality  |
| Giacin, Jack R.     | 12   | 0.59        | 0.00        | 0.41        | Package Product Interaction  |
| Hernandez, Ruben J. | 13   | 0.25        | 0.00        | 0.75        | Package Product Interaction  |
| Lee, Julian J. L.   | 13   | 0.20        | 0.00        | 0.80        | CAP/MAP and Protective Packaging                                       |
| Singh, Sher Paul    | 13   | 0.20        | 0.00        | 0.80        | Distribution/Transportation/Environmental Measuring/Packaging Dynamics |
| <b>TOTALS:</b>      |      | <b>1.94</b> | <b>0.00</b> | <b>4.06</b> |  |

## PROJECTS

|           |  |               |
|-----------|--|---------------|
| MICL01520 | Transport Properties of Polymer Films as Related to Quality and Storage Stability of Packaged Products | Giacin, J.    |
| MICL01735 | New Reusable Containers for the Fresh Produce and Meat Packaging                                       | Singh, S.     |
| MICL01828 | Improving the Quality of Products and Distribution Productivity Through Packaging Innovation           | Twede, D.     |
| MICL01831 | Design of Plastic Packages for Preserving the Quality and Safety of Food Products                      | Hernandez, R. |
| MICL01840 | Controlled Atmosphere and Modified Atmosphere Packaging of Fresh Produce                               | Lee, J.       |
| MICL01921 | Automatic Data Capture for Packaging Line Forces That Impact Operations                                | Clarke, R.    |





Photo by Bruce Fox

## Park, Recreation and Tourism Resources

Phone: 353-5190



Joseph D. Fridgen, Chair

### FACULTY

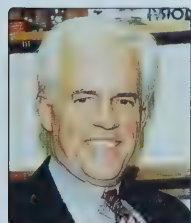
|                       | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST                              |
|-----------------------|------|-------------|-------------|-------------|---|
| Holecek, Donald F.    | 12   | 0.75        | 0.25        | 0.00        | Resource Economics/Tourism                    |
| Nelson, Charles M.    | 13   | 0.25        | 0.00        | 0.75        | Natural Resource Management                   |
| Propst, Dennis B.     | 13   | 0.50        | 0.00        | 0.50        | Psychology/Planning/Economics                 |
| Stynes, Daniel J.     | 12   | 0.50        | 0.00        | 0.50        | System Analysis/Research<br>Methods/Economics |
| Vander Stoep, Gail A. | 13   | 0.25        | 0.25        | 0.50        | Communications/Human Dimensions               |
| <b>TOTALS:</b>        |      | <b>2.25</b> | <b>0.50</b> | <b>2.25</b> |   |

### PROJECTS

|           |   |                  |
|-----------|---|------------------|
| MICL01766 | Social Science and Communications in Outdoor Recreation Resource Management               | Vander Stoep, G. |
| MICL01903 | Extent and Role of Participation and Choice in Outdoor Recreation Planning and Management | Propst, D.       |
| MICL03280 | Travel, Tourism and Recreation Resource Center  | Holecek, D.      |
| MICL03362 | Economic Impacts of Recreational Tourism  | Stynes, D.       |
| MICL09008 | Development of Nationally Representative Visitor Spending Profiles                        | Propst, D.       |
| MICL09009 | Corps of Engineers Marina User/Dock Owner Expenditure Study                               | Propst, D.       |

## Physiology

Phone: 355-6475



William S. Spielman, Chair

### FACULTY

|                     | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST        |
|---------------------|------|-------------|-------------|-------------|-------------------------|
| Dukelow, W. Richard | 12   | 0.40        | 0.00        | 0.60        | Reproductive Physiology |
| Jump, Donald B.     | 12   | 0.50        | 0.00        | 0.50        | Molecular Endocrinology |
| <b>TOTALS:</b>      |      | <b>0.90</b> | <b>0.00</b> | <b>1.10</b> |                         |

### PROJECTS

|           |  |          |
|-----------|--|----------|
| MICL01892 | Dietary Fat Regulation of Hepatic Gene Expression            | Jump, D. |
| MICL08205 | Dietary Fat Regulation of Hepatic Glycolytic Gene Expression | Jump, D. |

# Plant Research Lab (MSU-DOE)

Phone: 353-2270



Kenneth Keegstra,  
Director

## FACULTY

|                     | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST     |
|---------------------|------|-------------|-------------|-------------|----------------------|
| de Bruijn, Frans J. | 12   | 0.38        | 0.00        | 0.62        | Molecular Biology    |
| Howe, Gregg A.      | 14   | 0.23        | 0.00        | 0.77        | Plant/Insect Defense |
| Walton, Jonathan D. | 12   | 0.23        | 0.00        | 0.77        | Plant Pathology      |
| <b>TOTALS:</b>      |      | <b>0.84</b> | <b>0.00</b> | <b>2.16</b> |                      |

## PROJECTS

|           |  |              |
|-----------|--|--------------|
| MICL01886 | Mechanisms of Fungal Pathogenicity   | Walton, J.   |
| MICL01900 | Molecular Genetics of Plant Defense Against Insects                                  | Howe, G.     |
| MICL03376 | Interdiscipling Research and Training in the Plant Sciences                          | Keegstra, K. |
| MICL08178 | Control of mRNA Stability in Dicotyledonous Plants                                   | Green, P.    |
| MICL08197 | Photoperiodic Control of Gibberellin Metabolism in Long-Day Rosette Plants           | Zeevaart, J. |
| MICL08221 | Effects of Engineered Plant Respiration on Growth/Yield and Low Temperature Response | McIntosh, L. |
| MICL08230 | Co-Evolution of Phytotoxin Production and Auto-Immunity in a Pathogenic Fungus       | Walton, J.   |
| MICL08233 | <i>Pseudomonas syringae</i> pv. Tomato Hrp-Controlled Extracellular Proteins         | He, S.       |

## Remote Sensing (Center for)

Phone: 353-7195



Richard E. Groop, Director

## PROJECTS

|           |   |           |
|-----------|---|-----------|
| MICL01835 | Applications of Spatial Information Technologies to Management of Agriculture and Natural Resources | Groop, R. |
|-----------|---|-----------|



# Resource Development

Phone: 355-3421



Cynthia C. Fridgen, Chair

## FACULTY

|                       | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST                      |
|-----------------------|------|-------------|-------------|-------------|---------------------------------------|
| Beckwith, JoAnn       | 14   | 0.25        | 0.25        | 0.50        | Environmental Planning and Management |
| Bingen, R. James      | 13   | 0.40        | 0.00        | 0.60        | International Development             |
| Bronstein, Daniel A.  | 12   | 0.40        | 0.00        | 0.60        | Environmental Policy and Law          |
| Dersch, Eckhart       | 12   | 0.25        | 0.50        | 0.25        | Natural Resources Management          |
| Edens, Thomas C.      | 12   | 0.55        | 0.00        | 0.45        | Resource Economics and Policy         |
| Kakela, Peter J.      | 12   | 0.70        | 0.00        | 0.30        | Natural Resources Management          |
| Kaplowitz, Michael C. | 14   | 0.25        | 0.15        | 0.60        | Land Use Law                          |
| Norris, Patricia E.   | 13   | 0.08        | 0.20        | 0.72        | Land Use                              |
| Rosenbaum, Rene P.    | 13   | 0.40        | 0.00        | 0.60        | Community Economic Development        |
| Schultink, Gerhardus  | 12   | 0.50        | 0.00        | 0.50        | Natural Resources Management          |
| Witter, Scott G.      | 13   | 0.30        | 0.00        | 0.70        | Natural Resources Management          |
| <b>TOTALS:</b>        |      | <b>4.08</b> | <b>1.10</b> | <b>5.82</b> |                                       |

## PROJECTS

|           |   |               |
|-----------|---|---------------|
| MICL01536 | Comparative Indicators for Rural Development, Environmental Planning and Public Policy Formulation. | Schultink, G. |
| MICL01789 | Land Transformation in the Rural-Urban Interface  | Edens, T.     |
| MICL01817 | Watershed Management in the Rural/Urban Fringe  | Witter, S.    |
| MICL01851 | Water Resource Protection at the Interface of the Hydrologic Cycle and Cultural Influences          | Dersch, E.    |
| MICL01859 | Farm, Rural and Environmental Groups in Agricultural Research and Development Policy                | Bingen, R.    |
| MICL01860 | Pesticide Policy Studies  | Bingen, R.    |
| MICL01870 | Use of Impact Assessment in Policy Formulation  | Bronstein, D. |
| MICL03352 | Mineral Lands Development, Energy Requirements and Environmental Impacts                            | Kakela, P.    |
| MICL03358 | Economic Issues of Latinos in Rural Settings and Their Impact on Michigan Agriculture               | Rosenbaum, R. |

# Sociology

Phone: 355-6632



Thomas L. Conner, Chair

## FACULTY

|                            | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST                                   |
|----------------------------|------|-------------|-------------|-------------|--|
| Aronoff, Marilyn           | 13   | 0.25        | 0.00        | 0.75        | Rural Communities/Environment                      |
| Busch, Lawrence M.         | 12   | 0.47        | 0.00        | 0.53        | Agriscience Structure/Agricultural Research Policy |
| Harris, Craig K.           | 13   | 0.50        | 0.00        | 0.50        | Sociology of Agriculture                           |
| Johnson, Nan E.            | 12   | 0.50        | 0.00        | 0.50        | Demography   |
| Rudy, Alan P.              | 14   | 0.30        | 0.00        | 0.70        | Sociology of Agriculture                           |
| Vanderpool, Christopher K. | 12   | 0.20        | 0.20        | 0.60        | Environmental and Food Safety                      |
| <b>TOTALS:</b>             |      | <b>2.22</b> | <b>0.20</b> | <b>3.58</b> |  |

# Sociology (continued)

## PROJECTS

|            |  |               |
|------------|--|---------------|
| MICL01612  | Strategic Analysis of Technical Change in Commodity Subsectors                                       | Busch, L.     |
| MICL01751* | Rural Labor Markets in the Global Economy  | Bokemeier, J. |
| MICL01829* | Rural Restructuring: Causes and Consequences of Globalized Agricultural and Natural Resource Systems | Harris, C.    |
| MICL01842* | Commodities, Consumers and Communities: Local Food Systems in a Globalizing Environment              | Busch, L.     |
| MICL01864  | Rural Family Ties and Well-Being: Social Capital, Community Context and Household Strategies         | Bokemeier, J. |
| MICL01874  | Social Processes in Disability and Death for Nonmetro Americans: A Longitudinal Study                | Johnson, N.   |
| MICL01926  | The Management of Risk in Agrifood and Natural Resource System                                       | Harris, C.    |
| MICL01939  | Community Responses to Hazardous Waste Crises: Alternatives to Increased Public Involvement          | Aronoff, M.   |
| MICL08206  | Social Reduction of Disability for Nonmetro Elders: A Longitudinal Study                             | Johnson, N.   |

## Veterinary Pathology

Phone: 432-4680



Willie M. Reed, Interim  
Chair

## FACULTY

|                    | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST                                |
|--------------------|------|-------------|-------------|-------------|---|
| Bell, Thomas G.    | 12   | 0.25        | 0.00        | 0.75        | Comparative Pathology/Platelet Function         |
| Harkema, Jack      | 12   | 0.31        | 0.00        | 0.69        | Toxicology                                      |
| Holland, Margo S.  | 14   | 0.30        | 0.00        | 0.70        | Molecular Pathology                             |
| Padgett, George A. | 12   | 0.25        | 0.00        | 0.75        | Comparative Veterinary Pathology                |
| Patterson, Jon S.  | 13   | 0.25        | 0.00        | 0.75        | Veterinary Pathology/Infectious Disease/Animals |
| <b>TOTALS:</b>     |      | <b>1.36</b> | <b>0.00</b> | <b>3.64</b> |   |

## PROJECTS

|           |   |               |
|-----------|---|---------------|
| MICL01720 | Immunohistochemical Diagnosis of Infectious Diseases  | Patterson, J. |
| MICL01776 | Effects of Endotoxin and Other Organic Dust Constituents on Airway Mucous Cells               | Harkema, J.   |
| MICL01847 | Osteochondrosis: Development of Procedures to Control or Mitigate the Effects of This Disease | Padgett, G.   |
| MICL01882 | Molecular Aspects of Marek's Disease Virus Oncogenicity                                       | Holland, M.   |
| MICL06882 | Hemorrhagic Disorder in Noncytopathic Type II Bovine Virus Diarrhea Viral Infection           | Bell, T.      |





## Water Research (Institute of)

Phone: 353-3742



Jon F. Bartholic, Director

### FACULTY

|                  | RANK | MAES        | MSUE        | JOINT       | AREA OF INTEREST        |
|------------------|------|-------------|-------------|-------------|-------------------------|
| D'Itri, Frank M. | 12   | 0.10        | 0.00        | 0.90        | Environmental Recycling |
| <b>TOTALS:</b>   |      | <b>0.10</b> | <b>0.00</b> | <b>0.90</b> |                         |

### PROJECTS

MICL01838 Development of a Knowledge-Based Decision-Support System for Integrated Landscape/Watershed Planning

Bartholic, J.

### Faculty Appointments

|                     | MAES          | MSUE         | JOINT         |
|---------------------|---------------|--------------|---------------|
| <b>GRAND TOTALS</b> | <b>135.43</b> | <b>43.95</b> | <b>137.12</b> |

<sup>1</sup>Elton Smith Endowed Chair

<sup>2</sup>C.S. Mott Distinguished Professor of Sustainable Agriculture

<sup>3</sup>Hannah Professor for Microbial Ecology and Plant Sciences

<sup>4</sup>Nowlin Professor for Water Research (50 percent of the appointment is paid by the endowment)

<sup>5</sup>Clinton Meadows Chair

<sup>6</sup>Partnerships for Ecosystem Research and Management (PERM) positions with salary funded by the Michigan Department of Natural Resources

<sup>7</sup>GREEN (Generating Research and Extension to meet Economic and Environmental Needs) appointed faculty

*Futures* is the quarterly magazine of the Michigan Agricultural Experiment Station (though in 1999, Vol. 16, Nos. 3 and 4 were combined into one issue; likewise and Vol. 17, Nos. 1, 2 and 3). If you live in the United States and would like to receive *Futures* free of charge, write to: *Futures* Editor, 310 Agriculture Hall, MSU, East Lansing, MI 48824-1039, call 517-432-1555, or e-mail [depolo@msu.edu](mailto:depolo@msu.edu). *Futures* is also available for viewing on the MAES Web site at <http://www.maes.msu.edu>.

## Fall 1998/Winter 1999 Vol. 16, Nos. 3 and 4 Food safety: Managing Risk — Educating People



Food safety once again made headlines in Michigan at the end of 1998. News stories reported that the U.S. Centers for Disease Control and Prevention were blaming *Listeria*-contaminated hot dogs and lunchmeat from a processing plant in Zeeland for the deaths of 12 people and sickness of 79 others. Then the U.S. Department of Agriculture ordered Southfield-based Thorn Apple Valley,

Inc., to recall 30 million pounds of hot dogs and lunchmeat. No illnesses or deaths were attributed to the products, but the plant was cited for unsanitary conditions. Then Detroit-based Hygrades, also owned by Sara Lee, took 72,000 packages of hot dogs made at its Detroit plant out of stores after the Michigan Department of Agriculture found *Listeria* bacteria in sandwich spread made from the hotdogs.

Because *Listeria* is tasteless and odorless, is found virtually everywhere in the environment — in soil, dust, water, sewage — and, unlike most bacteria, can continue to multiply in colder temperatures, these outbreaks were frightening and confounding to all involved. The methods used to inspect the food supply were publicly questioned. How could this happen in what everyone agrees is the world's safest food supply?

Several times over the past five years, *Futures* has focused on food safety and the myriad questions attached to this broad, many-headed Hydra of a problem. On the surface, the issue seems relatively simple: everyone — consumers, producers and researchers — wants a safe and plentiful food supply. So if we all agree, why is there so much confusion and controversy surrounding the subject?

Untangling the web of food safety issues requires one to consider all the social, cultural, economic and environmental aspects of producing food — not a small task. We revisit the idea of food safety in this issue of *Futures* to update readers on the latest MAES research in the area, as well as to discuss some of the broader issues that influence policies regarding food safety and research.

The concept of risk plays an important role in understanding food safety. MSU is home to the National Food Safety and Toxicology Center (NFSTC), which recently hosted a

conference on risk analysis for people working on food safety at all levels. Several MAES researchers affiliated with the NFSTC are using risk assessment as a framework to study risks associated with food. Closely related to risk assessment is the idea of risk management — figuring out ways to minimize risk at specific points in the food system. Scientists agree that this is most effective when several links of the food chain, from producer to consumer, are targeted simultaneously.

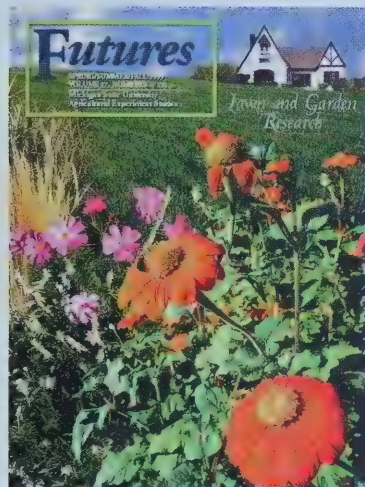
In 1996, the Food Quality Protection Act (FQPA) was passed unanimously by Congress and signed into law by President Clinton. The FQPA makes dramatic changes in the way the Environmental Protection Agency sets tolerances for pesticide residues on food crops and will likely affect the availability of pesticides for both food and non-food uses. To date, implementation of the FQPA has been slow, but many growers are fearful they may lose the use of certain pesticides that have been essential to producing high-quality crops in amounts that are profitable. Consumers are concerned that, while the implementation process inches along, they and their children are being exposed to levels of pesticides that may be unsafe. MAES scientists are working to help growers, consumers and industry representatives sort through the legislation and the issues surrounding it.

In 1994, the North American Free Trade Agreement (NAFTA) was implemented in the United States. NAFTA contains provisions for sanitary (human and animal health) and phytosanitary (plant health) measures that are modeled on those in the General Agreement on Tariffs and Trade (GATT). These measures, though intended to ensure the safety of the global food supply, can be used to restrict trade when countries implement them for protectionist purposes. Despite pages of agreements and articles, the line between food safety and free trade can be blurry and indistinct. Countries disagree over the validity of safety assertions, especially when lower priced imports threaten to damage a country's domestic producers. As trade agreements between countries have increased, non-tariff barriers such as food safety regulations have become more important. MAES researchers are working with Michigan growers, processors and exporters to help them understand NAFTA and GATT provisions and keep Michigan products flowing to other countries.

Food safety research is an important area of emphasis for the Michigan Agricultural Experiment Station. *Futures* will continue to examine the topic as new research results are reported and new issues emerge to ensure that Michigan people have access to the latest information.



## Spring/Summer/Fall 1999 Vol. 17, Nos. 1, 2 and 3 Lawn and Garden Research



It's impossible to imagine life in Michigan without lawns, trees, flowers and shrubs. Even in the steel and concrete corridors of Detroit, Grand Rapids, Flint and Lansing, diligent homeowners lovingly tend their yards and gardens, no matter how small. Apartment dwellers decorate balconies and fill window boxes with colorful pots of impatiens and geraniums. The pink

and white blossoms of flowering crabapple trees and the fins of tulip leaves peeking out from the soil announce spring with a beautiful flourish. Tourists drive hundreds of miles to more rural areas to gaze at the royal reds and golds of fall leaves or to be inspired by one of the state's public gardens.

Though it may seem unlikely for a state so far north, Michigan is the third largest wholesale horticulture retailer in the country, behind perennial front-runners California and Florida. Michigan commercial growers estimated the wholesale value of their crop in 1998 at \$235 million, up 11 percent from 1997. Michigan leads the nation in value of sales for 10 floriculture crops and is ranked second in national sales in five more. The state's greenhouse space increased 15 percent in the past year; only California and Florida have more total greenhouse cover.

Michigan also boasts the third largest number of golf courses in the country, many of them world-class.

At Michigan State University, Michigan Agricultural Experiment Station-funded scientists are working across a range of disciplines to assist the floriculture, nursery, landscape, turfgrass and horticulture industries in finding solutions to the problems and issues they face. Working in tandem with representatives of each commodity, the researchers are uniquely positioned to provide information that is relevant and quickly accessible to the people who most need it.

In this issue of *Futures*, we profile just a small fraction of the work going on in lawn and garden research to help keep the industry in top form.

At the request of growers in the state, a trio of horticulture scientists has been working since 1993 to develop step-by-step flowering prescriptions for certain perennials. The researchers

have determined the exact time for each production step so growers can work backward from a designated date when the plants are due in stores. For example, if lavender needs to be in flower and in stores on June 1, growers now know that they can produce a flowering lavender plant in seven weeks by manipulating temperature and the amount of light the plant receives.

MSU is home to the Robert Hancock Turf Center, a research facility where turfgrass scientists study everything about turf, from testing new grass varieties to controlling insects, weeds and diseases, and minimizing the impact of turf maintenance on the environment. The center also hosts annual field days for the Michigan Turfgrass Foundation, the Golf Association of Michigan and Turf Producers International so industry professionals can meet with researchers face to face.

The Michigan Turfgrass Environmental Stewardship Program, the first program of its kind in the country, is a partnership between MSU, the Michigan Turfgrass Foundation, the Golf Association of Michigan, the Michigan Department of Agriculture and the Michigan Department of Environmental Quality. The program allows golf course superintendents to evaluate their management practices and offers information and education on the latest ideas, research and regulations.

Because ornamental, nursery and landscape businesses sell living organisms and services related to those living things, not reams of paper or boxes of paperclips, they have to market themselves differently than a computer retailer or a grocery store. To assist these businesses in reaching out to consumers and to keep them on the cutting edge of research and technology, the MAES has assembled a cadre of scientists specializing in marketing, management and propagation who are working with industry representatives to identify and solve problems.

The research going on in ornamental horticulture, nursery and landscape horticulture, floriculture and turfgrass in the Michigan Agricultural Experiment Station mirrors the diversity of these industries. We hope you find these updates informative.

# MAES Contributors

July 1, 1998 to June 30, 1999

|   |   |
|---|---|
| 3M Canada Company                               | Cherry Growers, Inc.                        |
| AASCO   | Cherry Marketing Institute, Inc.            |
| AMVAC Chemical Corporation                      | Chiquita Brands                             |
| Abbott Laboratories                             | Clackamas Greenhouses, Inc.                 |
| AgrEvo USA Company                              | Clark Companies                             |
| AgraQuest, Inc.                                 | Clark County Sanitation District            |
| AgriPro Seeds, Inc.                             | Cleary Chemical Corporation                 |
| Agri-Business Consultants, Inc.                 | Clorox Company                              |
| Agrium, Inc.                                    | Coca-Cola Company                           |
| American Agricultural Economics Association     | Coloma Frozen Foods, Inc.                   |
| American Agricultural Services, Inc.            | Consortium for Plant Biotechnology Research |
| American Cyanamid Company                       | Conwed Plastics                             |
| American Fisheries Society of Michigan          | Cornell University                          |
| American Floral Endowment                       | Countrymark Cooperative, Inc.               |
| American Jersey Cattle Association              | DeKalb Swine Breeders, Inc.                 |
| Amway Corporation                               | DeWinter's, Inc.                            |
| Andersons, Inc.                                 | Dominion BioSciences, Inc.                  |
| Auxein Corporation                              | Dow AgroSciences                            |
| BASF Corporation                                | Dow Chemical Company                        |
| Ball Horticultural Company                      | DuPont Agricultural Products                |
| Bayer Corporation                               | Eastman Kodak Company                       |
| Bio-Cide International, Inc.                    | Ecogen, Inc.                                |
| Bordine Nursery, Ltd.                           | Egerton University                          |
| Branch-Smith, Inc.                              | Elf Atochem North America, Inc.             |
| C. Raker & Sons, Inc.                           | Eli Lilly & Company                         |
| Cargill Hybrid Seeds                            | Elsevier Science Ltd.                       |
| Celery Research, Inc.                           | Entek Corporation                           |
| Center Greenhouse, Inc.                         | Evenflo Company, Inc.                       |
| Center for Tropical and Subtropical Aquaculture | FFI Corporation                             |
| Centro Internacional de Agricultura Tropical    | FMC Corporation                             |
| Chelsea Milling Company                         | Federal Express                             |



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Florida Tomato Committee

Food Marketing Institute

Foundation for Agronomic Research, Inc.

Four Star Greenhouse, Inc.

Frito-Lay, Inc.

Fur Commission USA

General Mills, Inc.

Genesis Ag, Ltd.

Geoflow, Inc.

Gerber Products Company

Glass Corner Greenhouses, Inc.

Golden Plain Farms

Golf Course Superintendents Association of America

Gowan Company

Grand Rapids Nursery & Landscape  
Association, Inc.

Great Lakes Fisheries Commission

Great Lakes Hybrids, Inc.

Great Lakes IPM, Inc.

Great Lakes Protection Fund

Green Leaf Enterprises, Inc.

Griffin, L.L.C.

Gustafson, Inc.

Harris Moran Seed Company

Haskell Veterinary Clinic

Henkel Corporation

Henry Mast Greenhouses, Inc.

Hilltop Nurseries, L.L.C.

Horticultural Research Institute  
Endowment Fund

Huron Mountain Wildlife Foundation

IMC Kalium Canada, Ltd.

IMC Kalium, Ltd.

Ingham County

Inter-American Foundation

International Center for Agricultural Research in the  
Dry Areas

International Crops Research Institute  
for the Semi-Arid Tropics

International Dwarf Fruit Tree Association

International Life Sciences Institute,  
Research Foundation

International Turf Producers Foundation

Iowa State University

JEFO Nutrition, Inc.



Photo by Bruce Fox

Jack Brown Produce, Inc.

Jorgensen Farm Elevator

Joseph H. Hill Memorial Foundation, Inc.

KALSEC

Kalamazoo Valley Plant Growers Co-op

Kansas State University

Kaufmann, John E.

Kellogg Company

Kellogg's Corporate Citizenship Fund

King Milling Company

Knappen Milling Company

Kraft Foods, Inc.

Kropf Orchards & Storage, Inc.

Land O'Lakes, Inc.

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Lesco, Inc.

M&M Mars

MBG Marketing

MBI International

Marks and Spencer PIC

Martin Marietta Aggregates

Metropolitan Detroit Flower Growers' Association

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Michigan Agricultural Commodities, Inc.

Michigan Apple Research Committee

Michigan Asparagus Research, Inc.

Michigan Bean Commission PRAB

Michigan Beekeepers Association

Michigan Chapter of the Wildlife Society

Michigan Corn Growers Association

Michigan Corn Marketing Committee

Michigan Crop Improvement Association, Inc.

Michigan Department of Agriculture

Michigan Department of Environmental Quality

Michigan Department of Natural Resources

Michigan Farm Bureau

Michigan Jobs Commission

Michigan Onion Committee

Michigan Peach Sponsors

Michigan Pear Research Association





|  |  |
|--|--|
| Michigan Potato Industry Commission                  | Nutri-Quest, Inc                             |
| Michigan Soybean Promotion Committee                 | Nutrition Physiology Corporation             |
| Michigan State Horticultural Society                 | O.J. Noer Research Foundation, Inc.          |
| Michigan State Millers' Association                  | Ohio Floriculture Foundation                 |
| Michigan Turfgrass Foundation                        | Ontario Berry Growers Association            |
| Michigan Vegetable Council, Inc.                     | Paul Ecke Ranch                              |
| Michigan Virtual University                          | Pfizer, Inc.                                 |
| Mid-America Food Processors Association              | Phoebe W. Haas Charitable Trust              |
| Midwest Advanced Food Manufacturing Alliance         | Pickle Packers International, Inc.           |
| Mink Farmers Research Foundation                     | Pickle Seed Research Fund                    |
| Molbak's, Inc.                                       | Pillsbury Company                            |
| Monitor Sugar Company                                | Post Gardens of Battle Creek, Inc.           |
| Monsanto Company                                     | Pursell Technologies, Inc.                   |
| Mycogen Corporation                                  | QVC, Inc.                                    |
| Mycotech Corporation                                 | RESOURCE21, L.L.C.                           |
| National Aeronautics & Space Administration          | Rhône-Poulenc Ag Company                     |
| National Association of Animal Breeders              | Rockefeller Foundation                       |
| National Biological Control Institute                | Rohm & Haas Company                          |
| National Honey Board                                 | Rutgers University                           |
| National Institutes of Health                        | SC Johnson Wax                               |
| National Park Service                                | Saatzucht Steinach GmbH                      |
| National Pork Producers Council                      | Saginaw County Mosquito Abatement Commission |
| National Science Foundation                          | Samuel Roberts Noble Foundation, Inc.        |
| National Turfgrass Federation, Inc.                  | Scotts Company                               |
| National University of LaPlata                       | SePRO Corporation                            |
| NatureMark   | Seminis Vegetable Seeds, Inc.                |
| NCI-Frederick Cancer Research and Development Center | Serono Laboratories, Inc.                    |
| Neal Mast & Son Greenhouses, Inc.                    | Snack Food Association                       |
| North Central Soybean Research Programs              | Sonnyside Flowers                            |
| Novartis Crop Protection, Inc.                       | Sostram Corporation                          |
|  | Southern Illinois University                 |

|   |   |
|---|---|
| Southwestern Michigan Long Beards                                     | University of California-Davis                  |
| Spalding & Evenflo Companies, Inc.                                    | University of Florida                           |
| Stacy's Greenhouses   | University of Illinois                          |
| Star of the West Milling Company                                      | University of Michigan                          |
| Summerdale, Inc.  | University of Nebraska                          |
| Sybron Chemicals, Inc.  | University of Washington                        |
| Terra Industries, Inc.  | VAMTech, L.L.C.                                 |
| Titleist and Foot-Joy Worldwide                                       | Valent U.S.A. Corporation                       |
| Todd, George K. Sr.   | Viskase Corporation                             |
| Tomen Agro, Inc.  | W.K. Kellogg Foundation                         |
| Toro Company  | Walters Gardens, Inc.                           |
| Tropicana Products, Inc.  | Washington State Tree Fruit Research Commission |
| Troy Biosciences, Inc.  | Western Michigan Greenhouse Association         |
| TruGreen ChemLawn   | Westvaco Corporation                            |
| Twixwood Nursery  | Whitmire Micro-Gen Research Laboratories, Inc.  |
| U.S. Agency for International Development                             | Wilfarm L.L.C.                                  |
| U.S. Borax, Inc.  | William Beaumont Hospital                       |
| U.S. Department of Agriculture  | Wisconsin Department of Natural Resources       |
| U.S. Department of Commerce   | Witco Corporation                               |
| U.S. Department of Energy   | Woodward-Clyde Federal Services                 |
| U.S. Department of the Interior                                       | World Travel & Tourism                          |
| U.S. Environmental Protection Agency                                  | Xerox Corporation                               |
| U.S.D.A. Agricultural Research Service                                | Zeneca, Inc.                                    |
| U.S.D.A. Cooperative State Research, Education<br>& Extension Service |   |
| U.S.D.A. Forest Service   |   |
| Uniroyal Chemical Company, Inc.                                       |   |
| United Duroc Swine Registry   |   |
| United Industries Corporation   |   |
| United Soybean Board  |   |
| University of Arkansas  |   |

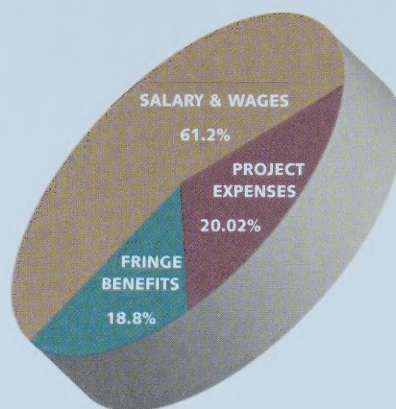


# Financial Report

47

July 1, 1998 to June 30, 1999

## DISTRIBUTION OF APPROPRIATED FUNDS



### INCOME:

**\$66,075,402**

**Federal Appropriations** .....\$5,090,973

Hatch \$ 3,877,510

McIntire-Stennis \$ 206,354

Hatch RRF \$ 929,643

Hatch Animal and Disease, Section 1433 \$ 77,466

**State Appropriations** .....\$30,268,300

**TOTAL APPROPRIATIONS:** .....\$35,359,273

**Grants — Federal, State and Private** .....\$30,716,129

### EXPENSES:

**\$66,075,402**

Salaries \$21,632,657

Fringe Benefits \$ 6,659,820

Project Expenses \$ 7,066,796

Grants — Federal, State and Private\* \$30,716,129

## Personnel

(Full-time Equivalents Funded From Appropriated Funds)

**Research Staff\*\*** **156.27**

Professors 76.62

Associate Professors 28.72

Assistant Professors 24.11

Research Associates and Specialists 26.82

**Support Staff** **156.30**

Administrative Professionals 75.53

Supervisors 25.12

Clerical 45.82

Technicians 9.83

\* Grants are reported using most recent three-year average

\*\* Does not include department chairpersons/unit administrators







**MICHIGAN AGRICULTURAL EXPERIMENT STATION**

**J. Ian Gray, Director**

109 Agriculture Hall

Michigan State University

East Lansing, Michigan 48824-1039

**MICHIGAN STATE  
UNIVERSITY**

**SR-118, April 2000**

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